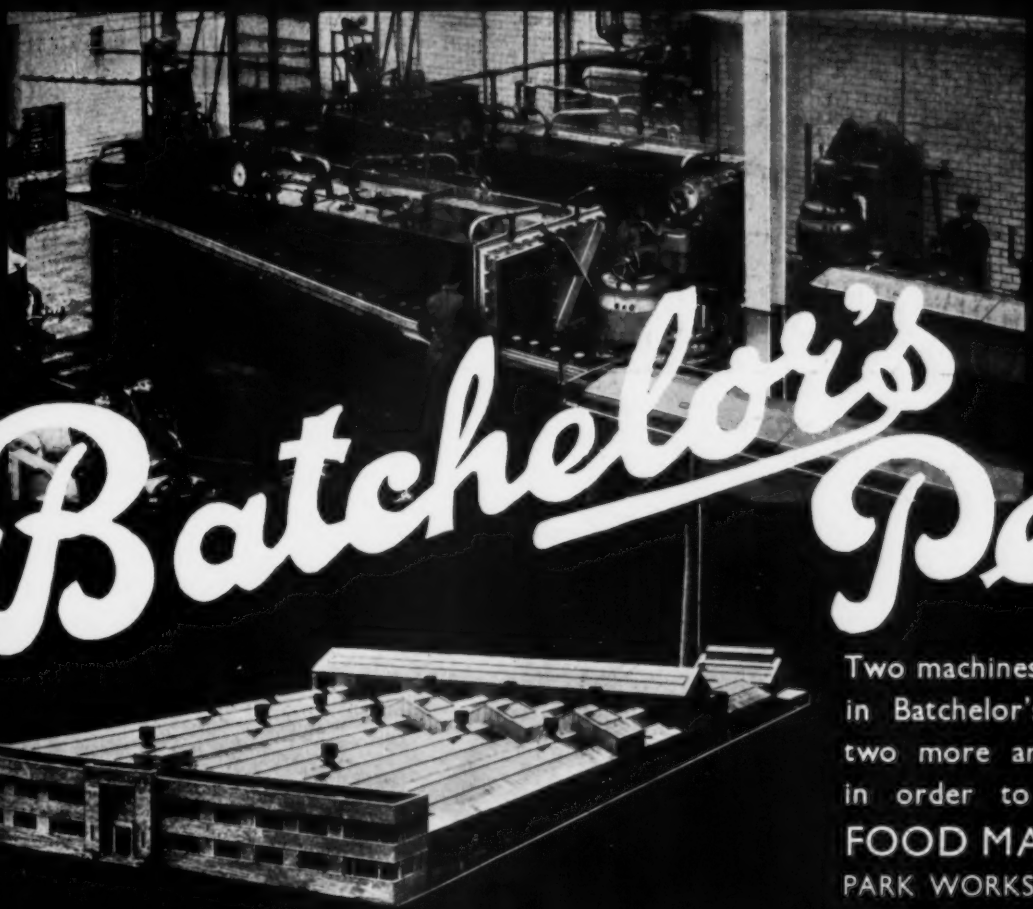
FOOD MANUFACTURE

FOOD MANUFACTURE

PUBLISHED BY LEONARD HILL LIMITED, 17, STRATFORD PLACE, LONDON, W.1 JULY, 19

ORLD'S LARGEST PEA CANNERS ORDER
2 MORE M&P PRESSURE COOKERS



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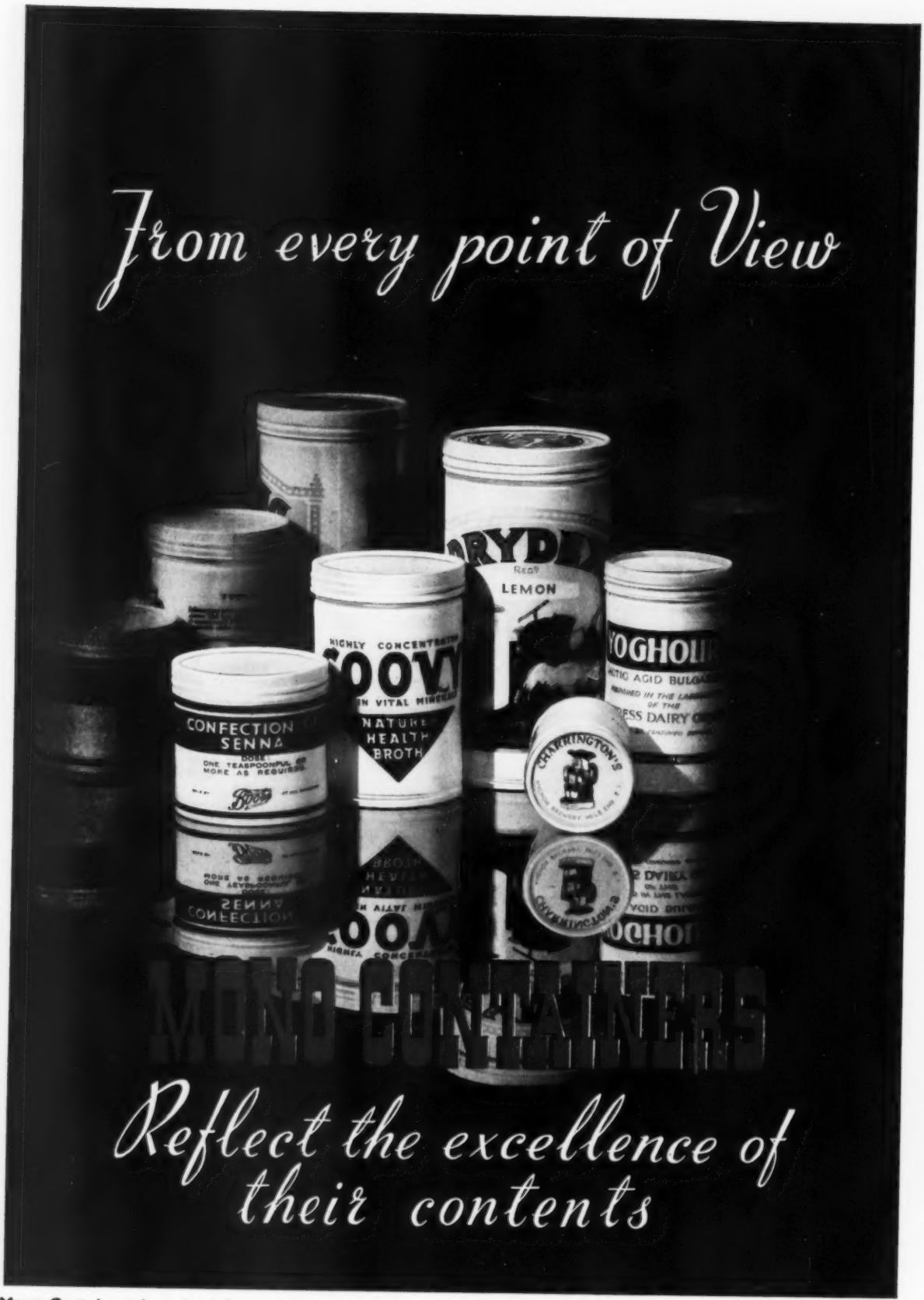

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A JOURNAL DEVOTED TO THE PRODUCTION AND MANUFACTURE OF ALL EDIBLE COMMODITIES INVOLVING A PROCESS OF MANUFACTURE.

FOOD MANUFACTURE

Incorporating Canning, Packing and Preserving.

VOLUME . . . XIV

NUMBER . . . 7

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Meat Products Number

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The Editor will be glad to consider contributions from those engaged in the Food Industry. Articles intended for publication should be of a practical nature and accompanied by photographs or drawings when possible.

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FOOD MANUFACTURE

Vol. XIV, No. 7 July, 1939

Progress

ON JULY 7 readers of FOOD MANUFACTURE will receive the weekly issue of *Food Industries Weekly*, and for every week following, except on dates when FOOD MANUFACTURE itself is published, they will have on their desks a copy of the Weekly, containing the latest news of food manufacture and allied industries, within a few days of the actual happenings.

FOOD MANUFACTURE and its weekly contemporary are now to work in double harness. There will be no change in the form of FOOD MANUFACTURE, which will remain the authoritative journal on food processing, covering a large number of exclusive articles by experts in various fields, as well as its other well-known features.

Our readers will gain by receiving each week a complete news service, not only covering Great Britain, but the Continent and U.S.A. Such a service weekly and monthly to the same subscriber has no parallel in journalism.

Pig Problems

Again we turn to the already well-ventilated subject of pigs. There is no doubt whatever that the producers of bacon pigs are becoming more and more restive about the position of the Marketing Scheme. It is not a matter of argument that the contract system is dead. What producers want to know is whether anything is being done about the matter. It is now a long time since the annual general meeting of registered producers was adjourned on March 30, and a special committee has been enquiring into the working of the schemes and we understand it has presented its report to the Bacon Development Board. The latter, being an autocratic body, may take no action at all or any it pleases. This may be serving some useful purpose, but time is getting on and producers are worried and want to hear something from the Pigs Board about the course of events, and they are demanding a re-convened general meeting. The Pigs Marketing Board has made many mistakes, but, as we pointed out at the time, the most colossal one was the impossible attempt to control the marketing of only one section of the pig supply. We even misquoted Gilbert, "when every pig's a baconer up goes the price of porkers". We still feel that control of all pigs is essential for the smooth working of the scheme, and we feel that when fresh legislation is framed it will be on these lines. The producers must realise, however, that fresh legislation is impossible until existing contracts run out. They must be completed faithfully by both sides. Some other way out is, therefore, essential, and either the Board should fade out of existence or do something at once to justify itself.

Larvæ in Bottles

No longer is the saying "the fly in the ointment" alone in expressing annoyance. It may soon be rivalled by one such as "the maggot in the fruit". A recent prosecution at Birkenhead was instituted against a grocer who had deposited ten jars of bottled loganberries for sale which were unfit for human food. The proceedings were interesting. The chief sanitary inspector said there were two jars of loganberries in the shop window in which he could clearly see maggots. Later he examined eight other jars of loganberries and found maggots in them all. The grocer said he had bought the bottles from a reputable firm of bottlers, and relied on the guarantee of the bottlers. The defence was interesting. It was stated that the jars were subjected to a heat of 190°, which killed the larvæ, and that the loganberries were perfectly wholesome. It was an instructive case from the general public's point of view because two authorities on food and canning gave evidence. Mr. Nicol, of the British Association of Research, said that it was natural to find larvæ in bottles of loganberries but that these did not detract from the wholesomeness of the berries. Then Mr. Hirst, the well-known Bristol authority, said that if the prosecution succeeded it would cause considerable damage to the industry. He pointed out that they had carried out experiments adding larvæ to bottles of loganberries and had eaten them without being affected. The summons was dismissed—in our view

a wise decision, as a ruling in the other direction would have practically prohibited the bottling of such fruits as loganberries and raspberries. Then people would be compelled to eat the raw fruits, which, in many cases, contain far more larvæ than the bottled variety and, in addition, are alive.

Wages during Illness

The Marrison *v.* Bell case, to which we have made previous reference in our April issue, has now become famous, and there have been sequels. At Reading on April 20 an employer was compelled to pay an employee £19 5s. for wages accruing during a period of illness, despite the fact that the judge described the employer as " a very good employer ". A further case was heard in the Mayor's and City of London Court on May 15, and a judgment, which counsel described as of " tremendous importance ", was given, again in favour of the employee. In this case the man was in the employ of MacFisheries, Limited, and it was alleged that a term of his employment was that while incapacitated by illness he should be entitled to no remuneration but should receive sick pay at half-pay rate for a maximum period of twenty-one days per annum. In spite of the fact that he had actually been paid for five weeks instead of the three he was entitled to, judgment was given in his favour for £71 17s. 6d. with costs. The position affects so many employers that the National Industrial Alliance has made an enquiry to find out what steps certain companies propose to take as a result of the Marrison *v.* Bell decision, and finds that not every employer is prepared to pay full wages whilst an employee is receiving National Health benefits. There is no tendency to give notice to employees and to re-engage them, as this would affect pension schemes based on length of service. In some cases where wages are not payable during sickness, the position has been clarified by a written intimation to the employee that it is a condition of the employment. This seems to be the likely course to be adopted, and all employers would be well advised to act in this way as soon as possible and have printed contracts prepared for signature by the employee.

Family Allowances

Mr. Lawrence Cadbury recently addressed the National Nutrition Conference and made some interesting remarks in connection with the Bournville scheme for the industrial application of family allowances. This scheme provides for an employee who has three or more children under the age of 18 years an allowance of 5s. per week paid in respect of each child in excess of two, as long as the children in excess of two are attending an approved course of education. The scheme applies to all staffs and there is no salary limit. There are 5,400 male adults on the staffs, and there are now 284 families drawing money from the scheme for 410 dependent children. Of the 284 families nearly 200 are families of three dependent children. Fifty have four dependent children, twenty have five, and two have eight. An early problem to be faced is how payment should be made. Most advocates of family allowances are insistent that the money be paid to the wife. Against this is the objection of administrative inconvenience and the implied distrust of the wage-earner. Cadbury's have compromised by putting the money up in a separate envelope addressed to both husband and wife. To assure the administration of the money by wife as well as husband, application forms have to be signed by both, and it is proposed that as each new employee becomes an applicant both husband and wife will be sent a copy of the notice inaugurating the scheme. Some interesting figures have been obtained from a questionnaire as to how the extra money is spent. The favourite single item both in the high and low wage groups is clothing and boots, the second in each group is special food for the children. An astonishingly small proportion is being spent in things like radios and gramophones and an even smaller percentage on amusements. When the scheme was announced the firm laid special emphasis on the subject of nutrition, and the promoters must feel gratified that such a large proportion of the allowances has gone in this direction.

Cereals and Vitamin B_1

Mr. R. R. Williams, of the Bell Telephone Laboratories, New York, in the current number of *Cereal Chemistry*, asks a very interesting question—" What are the constituents which *must* be present in their food if animals are to survive ? " Although dietitians and physiologists have played about with solutions of this problem the issue is still unsettled. We do not propose to enter into any details of Mr. Williams' thiamin theory, interesting though this may be, but there are one or two other points in the paper which raise intriguing ideas. The " profound bit of philosophy regarding the selection of human food " is an example. When we eat eggs or oysters we are taking advantage of everything that the living organism contains because the egg

and the oyster have grown and developed fully and, therefore, contain all that life (even if restricted) requires. If we choose liver, kidney or sweetbread, we indulge in products of varied glandular activity and reap the benefits peculiar to these. When we drink milk we consume the natural complete food of the very young. Mr. Williams informs us that if we partake of leaves we are consuming tissue that yesterday, or a week ago, was in the active process of growth, and, accordingly, of thiamin synthesis. "Eat the whole seed and one assimilates the entire organism which, while it is for the moment at a dormant stage, is still demonstrably capable of a lively development. But carefully to sift the starch from the other parts of the seed and make the starchy endosperm the chief source of energy for human life is to fly in the face of Providence."

Although Mr. Williams is here touching the fringe of the white *versus* wholemeal bread controversy, he somewhat weakens his potential case by declaring that "one cannot of course ignore the popular fancy for white bread, nor the concrete fact that whole cereals or their mill products are more subject to spoilage than the whiter forms (in part, for the excellent reason that the latter will scarcely support bacterial or insect life). He also says that "one cannot ignore the testimony of qualified physicians that branny roughage is irritating to the intestinal tracts of some people, though that is probably more a matter for the hospital dietitian than for the housewife".

He suggests that all these are part of the large problem which the carbohydrate industries face, that of making their staple products more nearly the equivalent in nutritive value of the whole of the whole seed or the cane stalk, as it was once consumed by primitive man. "Whether this be done by addition of synthetic materials or by retention of the original nutritive components of the crude foodstuffs is a question for industry to decide." Meanwhile, sugar and salt are among the chemically purest things manufactured, and apart from the little coterie of "back to nature" enthusiasts, who eat unrefined sugar and brown rock salt, they have few detractors. We cannot turn back the clock—rather let us take advantage of synthetics even if it does at first sight seem silly to take something out of things and then put it back again. But there's more to it than that.

Sterilisation of Canned Foods

The classification of processing problems is one of the items discussed in a valuable paper by F. C. W. Olson and H. P. Stevens, of the Research Department, American Can Company, Illinois, and published in *Food Research*, Vol. 4, 1.

The types of problems may be considered as follows:

1. How long must a can be processed in order to destroy the spores of a particular organism?
2. What is the "sterilising value" of a given process?
3. How long must a can be processed in order to reach a given temperature at the slowest heating point of a can?
4. What is the temperature at the slowest heating point at the end of a given process?

The sterilising value of a process is defined to be the length in minutes of an equivalent process at 250° F., where the can contents immediately upon the beginning of the process attain retort temperature, are held at that temperature for the length of the process and at the end of the process instantaneously drop to a sublethal temperature. The length in minutes of this equivalent process is often referred to as the F value. This concept is of great value, as it permits a quantitative evaluation of different processes.

The solutions to the problems may be found very readily by means of the nomograms constructed for the graphic calculation of thermal processes for non-acid foods exhibiting straight-line, semi-logarithmic heating curves. Several typical examples of problems and the manner in which they are worked out by the nomogram are given. Once the use of the nomogram is mastered it should be of value to the scientific canner.

The Apple Diet

Treatment of all varieties of infantile diarrhœa with what is now called the apple diet has been widely recommended both in Europe and America. The routine advised is to give 1 to 2 oz. ripe, raw, grated apple every two hours, day and night, for one to two days, and it has been claimed that a rapid abatement of the diarrhœa and toxæmia is thereby obtained. There is doubt as to what portion of the apple produces the beneficial effect, but the general view is that it is due to the pectin. In his Ingleby Lecture to the University of Birmingham, however, Dr. Smellie spoke very pessimistically about the apple diet, and said that he had never seen even temporary improvement from its use in infantile diarrhœa. In spite of this, the remedy is finding fresh converts on the Continent, and the alleged usefulness of apple pulp is now attributed by Corsonello not to the cellulose or

tannic acid it contains but rather to the pectin, which, he says, acts by absorption of water, toxins and bacteria either in alkaline or in acid fæces. Pectin, which is the methyl ester of pectic acid, has been produced commercially for many years, and it was thought for a long time that to get a stiff gel in jams an acid medium was necessary. Ten years ago Spencer proved that gels could be got equally well in alkaline media. This is important in the treatment of diarrhœa, as the fæces may be acid or alkaline. In spite of Dr. Smellie's pessimism there seems to be something in the diet. Our grandmothers taught us that an apple a day would keep the doctor away, but, *autres temps autres mœurs*, now the idea seems to be for the doctor to bring with him an apple a day for the benefit of our suffering infants.

Carotene Absorption

The influence of liquid paraffin on carotene absorption has long been recognised. Burrows and Farr showed, twelve years ago, that rats could not utilise the vitamin A of butter fat when it was mixed with liquid paraffin. The next discovery was that it had no effect on the utilisation of the vitamin A of cod liver oil. This rather curious discrepancy was not explained until Moore was able to differentiate between vitamin A and its precursor carotene.

Subsequent animal experiments have proved that whereas the absorption of carotene is seriously interfered with by the presence of liquid paraffin in the alimentary tract that of vitamin A itself is not.

Curtis and Kline have now proceeded a stage further. They have recently published work on the effect of the administration of liquid paraffin on the blood carotene in human beings. In people taking a low carotene diet the blood carotene fell steadily when crystalline carotene dissolved in cotton seed oil mixed with liquid paraffin was given, but rose rapidly when the carotene solution was given alone.

In the case of patients on a high carotene diet when liquid paraffin was taken before meals the carotene in the blood remained constant, but when the paraffin was omitted it rose rapidly. If the paraffin is taken at night when it cannot mix with the food no effect is observed.

These findings are a strong argument against the common practice of prescribing paraffin at meal times, when many people think it acts best as a laxative, and evidently liquid paraffin is not quite so inert as has been hitherto believed.

Bacon and Cleanliness

It is curious that while the synonym of dirtiness is "pig," the cleanest people in this country work in the bacon factories. Their working conditions and personal cleanliness are more closely regulated than those in any other industry. Making bacon is a race between micro-organisms and the curing salt, and British bacon factories are using refrigeration, proper ventilation systems, and vast quantities of soap and water and disinfectants, as precautions against possible contamination by dirt or germs at any stage of process. As a condition of their licence under the British bacon development scheme they must comply with a high standard of hygiene.

The ideal conditions are laid down in a book just published by the Bacon Development Board, entitled, *Hygiene in the Bacon Factory*, which can be secured for the modest outlay of 1s.

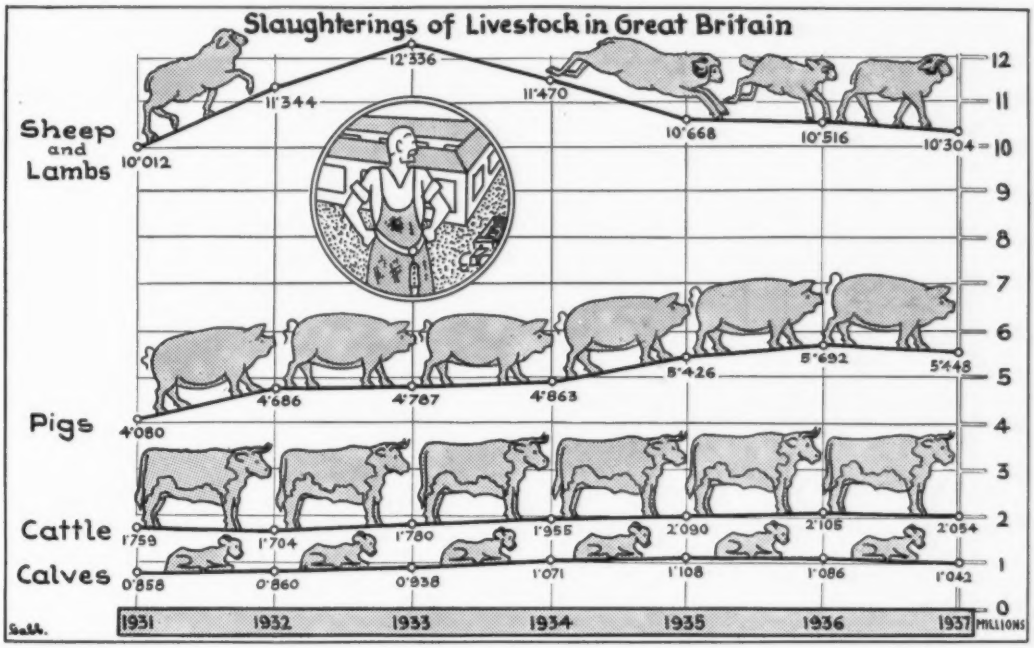
These conditions are more necessary to-day because the modern taste is for a mild-cured bacon, which, instead of being heavily salted and keeping for a year, is a semi-perishable product that may be eaten within three weeks of the death of the pig.

Quick-Ripening of Cheese

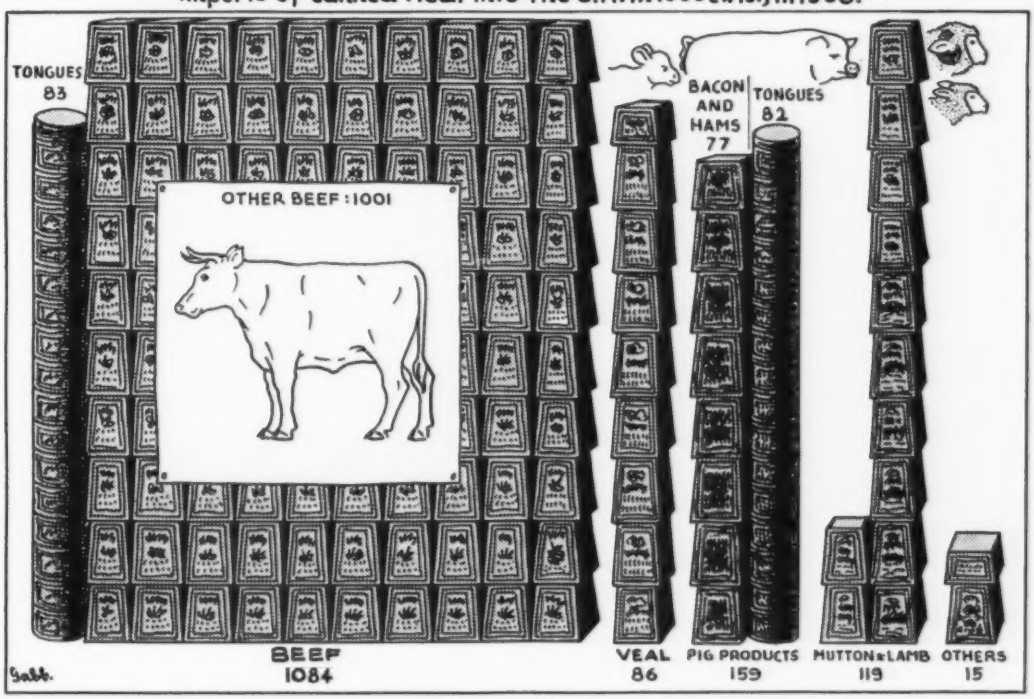
In this issue the "ageing" of beef is discussed in an article by C. Robert Moulton, "Ultra-Violet Radiation in the Meat Packing Industry". Another extremely interesting example of artificial "ageing" or ripening of foodstuff is disclosed in German Patent 666,813 (granted October 28, 1938, to George Friedel, Dresden, Germany), reported in *Food Industries*, which claims a novel means of accelerating the ripening process of cheese. The method simply uses oxygen or air as the ripening agent, but the manner of increasing the exposure to oxygen is new. A colloidal material, suitably one which is closely related in composition to the cheese itself, is beaten to a froth and spray-dried in air. The resulting bulky powder (dried froth bubbles) is incorporated in the curd, or in the raw cheese, thus introducing a relatively large body of entrained air. Ripening is hastened by this intimate admixture of fine air bubbles with the cheese.

The colloidal powder may be casein, neutralised with potassium, calcium or ammonium hydroxide. Another colloid which is effective, but is not similar to cheese in composition, is methylcellulose. If air alone does not suffice to give the ripening effect desired in a given case, the air used for treating the colloid after spray-drying the froth may be fortified with oxygen or ozone. To prevent escape of air the treated cheese may be coated with a film of methylcellulose.

LIVESTOCK BRITAIN KILLS FOR CONSUMPTION



CANNED MEATS BRITAIN IMPORTS



"What say you to a fat TRIPE—finely broiled?"—*The Taming of the Shrew.*

LANCASHIRE'S HOSTS

A great Roman Emperor ordered tripes to be served on golden salvers at the feast of Achilles. Samuel Pepys, Shakespeare, Bobby Burns, Oliver Goldsmith, and Charles Dickens have all praised the dish. It is an important item of the large range of flesh foods prepared by UNITED CATTLE PRODUCTS LIMITED, whose well-earned *sobriquet* heads this description of the Levenshulme Factory by T. CROSBIE-WALSH, *F.I.C.*

HERE is still another dynasty of food suppliers. The grandfather of the present Managing Director of United Cattle Products, Ltd., founded, in 1830, the business that now boasts a hundred retail shops and a hundred restaurants, the requirements of which, in the direction of flesh food products, are supplied not only by the Levenshulme factory but eleven others.

In 1911, Mr. J. S. Hill, with his co-director, the late Mr. Archer Miller, purchased a business in Bolton known as Vose and Son, and thereafter purchased other businesses in Manchester, Bolton, Rochdale, Burnley, Stockport, Ashton, Oldham, Blackpool, Bury, and Wolverhampton. Minor businesses were also acquired in the smaller towns and districts surrounding the towns mentioned.

It was in 1920 that the amalgamation of the whole of the businesses was effected in the name of the United Cattle Products, Ltd., and the concern has been carried on in that name ever since.

There is a special atmosphere surrounding the factory at Levenshulme. Mr. Louis Hill, who took me round the factory, is of the fourth generation, and of his enthusiasm, his obvious capacity for hard work and his pride in the achievements of his firm there could be no doubt. Working in the factory are several sets of grandfathers, sons and grandsons working cheek by jowl, and there is an obvious personal touch to be discerned which no doubt goes far to alleviate the austerities of modern industrial life.

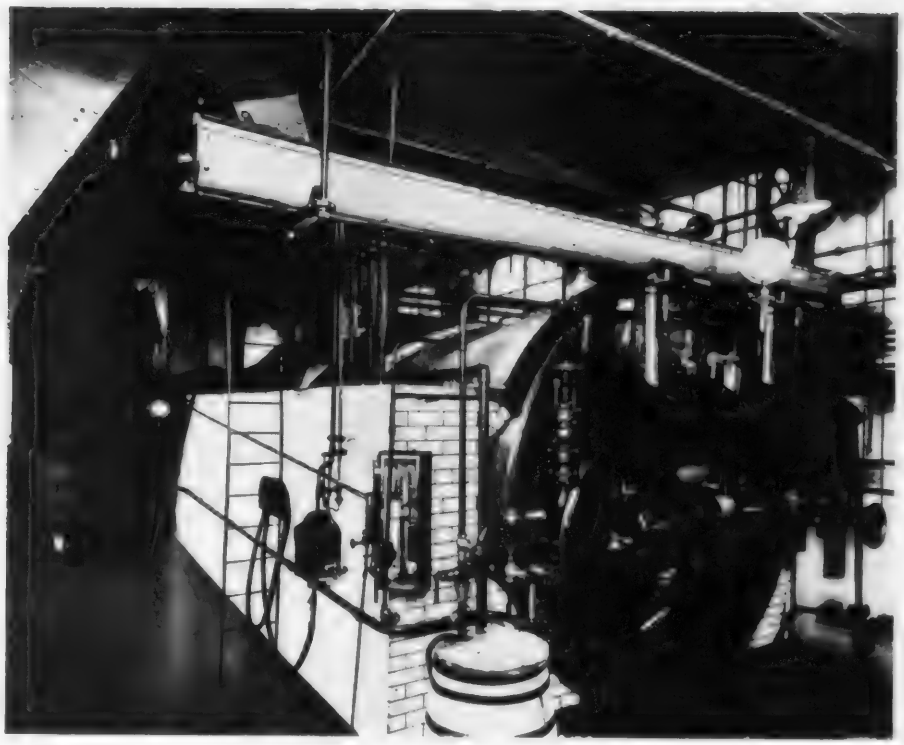
The Levenshulme Factory

The factory, which was built thirteen years ago, presents an attractive external appearance. The main courtyard has a well-kept lawn and flower-beds, and in front of the bakery and welfare building is a rock garden. These courtyards have so restful an air that it is almost impossible to visualise the tremendous activity which exists just a few yards away within the buildings.

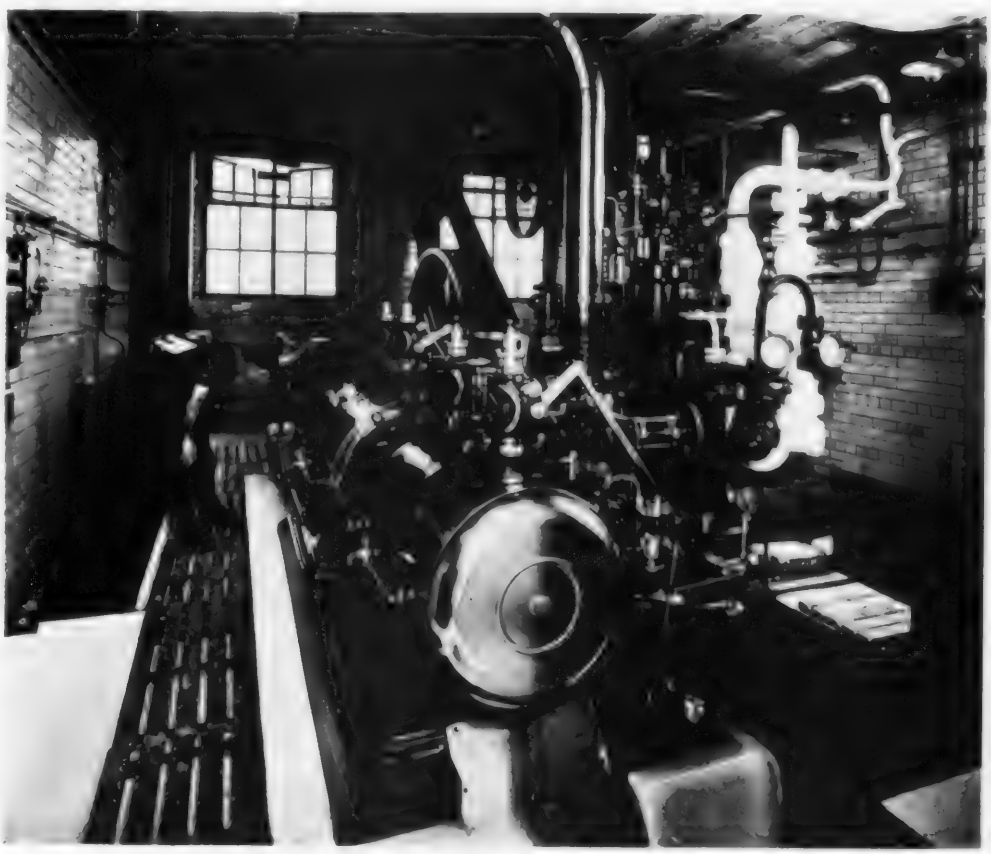
The layout of the different departments of the factory has been excellently planned. Compactness is the principal note, but it has been achieved without overcrowding and without sacrifice of efficiency.

There are four main departments which are concerned with:

1. The preparation of tripe and cowheels.
2. The making-up of meats and *delicatessen*.
3. The preparation and baking of pies, etc.
4. Poultry, fish and sundries for distribution to restaurants and cooked food shops.



A 1,200-h.p. Lancashire Boiler provides steam and power for the factory and is provided with an automatic stoker and CO_2 recorders.



The main compound engine is coupled to ammonia compressors of 50 and 25 tons refrigeration capacity. The larger compressor is concerned with water cooling and cold storage, while the smaller one is for ice production. The condensers are of the atmospheric type which require only a small amount of make-up water.

Boiler and Engine House

A 1,200-h.p. Lancashire Boiler provides steam and power for the factory, and is provided with an automatic stoker and CO_2 recorders.

Two thousand gallons of water per hour are cooled to 30° F. and 18,500 cubic feet of storage are held at the same temperature, and 6 tons of ice, used exclusively for the factory, are made daily.

The main Marshall compound engine is coupled to ammonia compressors of 50 and 25 tons refrigeration capacity. The larger compressor is concerned with water cooling and cold storage, while the smaller one is for ice production.

As water for condensing purposes has to be economised, the condensors are of the atmospheric type which require only a small amount of make-up water. The water cooling is carried out by galvanised refrigerator coils placed in three wooden tanks. The temperature in the main cold room and the air-lock is maintained by direct expansion piping, but air circulation is provided in the meat room.

It is considered by Mr. J. S. Hill, who is actively interested in this side of the business, that the type of cooler installed has fully justified itself by results.

Tripe Preparation

The stomachs, etc., are collected from the abattoirs every day, thus ensuring complete freshness.

Immediately on their arrival at the factory they are cut open and immersed in hot water, which loosens the dark mucous membrane from the inside of the stomachs. This preliminary treatment is carried out in large wooden vats, and after its conclusion the material is carried on a moving belt to the tripe-scraping machine.

This machine is interesting from more than one point of view. It was designed by the present managing director's nephew and subsequently perfected by the former. A brass *plaque* to this effect is attached to the side of the machine.

It consists of five enclosed serrated steel rollers which, revolving, come into contact with the tripe and keep it in continual movement during the time it is in the machine. The machine contains 6 or 7 stomachs at a time, and the scraping operation is a continuous one, the stomachs being fed in singly, and as one enters it ejects a treated one at the other end. After scraping, the stomachs are rinsed two or three times.

The cooking operation comes next. This is done in rectangular cooking tanks, the water in which is heated by closed steam coils.

Tripe Dressing

The cooked tripe is next cooled and "dressed". The membrane from the inside of the stomachs has already been removed, but there still remains the outside membrane, with which is associated a certain amount of fat.

The dressing involves skilful hand work, and the membrane is removed without damage to the meat and without the removal of the fat, which is highly esteemed as part of the product.

The now attractive-looking article is passed immediately to large tanks of water in which float copious supplies of ice, and it is from these tanks that supplies for the shops and restaurants are drawn as required.

The preparation of tripe is a typical example of the care taken to ensure quality and freshness in connection with the highly perishable types of food handled.

I visited the factory at the peak of the recent heat wave, during which the tripe department was working at high pressure. During the hot weather there is a sudden and extensive demand for this article of food in Lancashire and Yorkshire. In these districts it is the custom to eat it cold, whereas in the southern counties of England it is preferred as a hot dish, and the demand is greatest in the winter.

Cowheels

Cowheels are another delicacy well-beloved in Lancashire and Yorkshire, and their preparation receives the same meticulous attention as that bestowed on tripe.

The feet come to the factory cut as far as the top of the shank bone or knee.

Coming, as they do, straight from the abattoir, their cleaning is an important item. The cleaning is done in a cylindrical rotating washer of large capacity. The cylinder is loaded with the feet, set rotating the while sprays of water drench the material.

The cleaned feet are then boiled, and first the hair and then the hoof is removed. The hoof is sent to the dryers, and finally finds its way to the makers of buttons and other commoditites.

The main products made from the feet are (1) cowheels and (2) neat's-foot oil.

The valuable oil contained in the feet and bone is collected and refined. The refined oil undergoes a final treatment in a high-speed separator with a velocity of 8,500 revolutions a minute. It is recommended for a variety of uses—as salad oil, as a cough cure taken internally, as an embrocation, as a dressing for burns and scalds and as a leather dressing.

Pie Making

A very attractive-looking department this. The white tiles of the walls and the clean cement flooring and the ample elbow room give an added air of efficiency to the whole business.

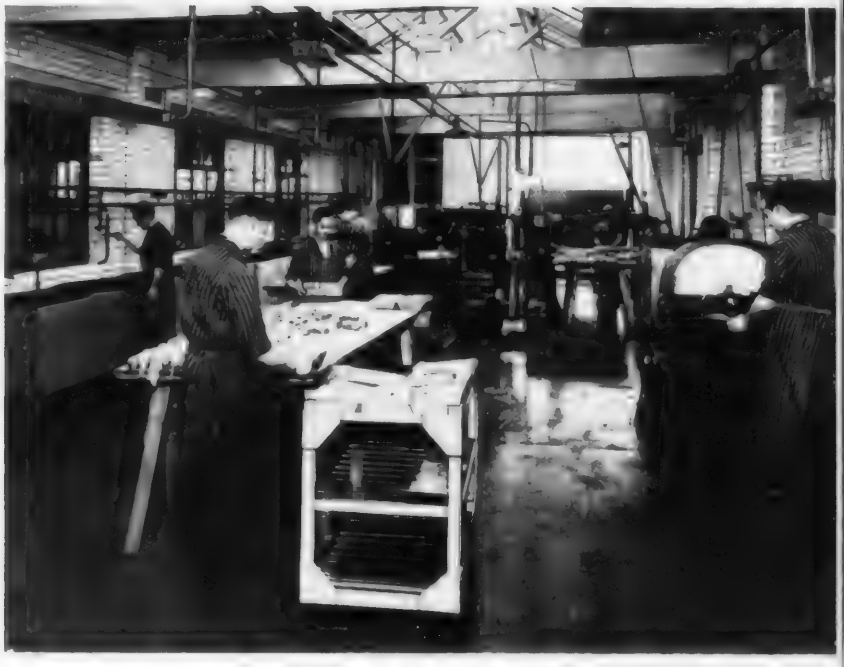
The raw meat for the pies is cut and prepared on metal and marble-topped tables, and in small batches is placed into the hoppers of the automatic pie-making machines.

The first machine, which is fitted with a hopper for the pastry, which is made in the same department, weighs the requisite amount of pastry for one pie into a "patty pan". The machine then presses the pastry to form the bottom layer and trims it all round the pan.

Along a moving belt, the little pans arrive at the second machine. Here a weighed quantity of meat is delivered automatically, after which the "lid" of the pie is put on by hand.

Still travelling by belt, the pie gets into the hands of the third machine, which trims the lid of the pie and

The membrane from the inside of the stomachs has already been removed, but there still remains the outside membrane, the removal of which involves careful hand work.



A large range of fancy meats is made in the *delicatessen* department. In the background can be seen the sausage-filling machines.

Cowheels are another delicacy well-beloved in Lancashire and Yorkshire, and their preparation receives meticulous attention. Neat's-foot oil is another valuable product made from cows' feet.

An attractive-looking place is the pie-making department. On the bottom left is the electrically worked pastry roller. In the background are the automatic pie-making machines.

"crimps" it round the edge, giving it an attractive appearance.

After being brushed with egg-white, the pies are conducted to the oven.

Immediately after cooking, and as soon as they are reasonably cool, such pies as are not required for immediate despatch are placed in a cool chamber (at about 38° F.) until required, but as a rule they are shipped to their various destinations almost immediately after cooking and cooling.

This pie-making department appears to be a most tranquil place—no evidence of hurry and scurry—yet 180 dozen half-pound pies are turned out per hour on the three little machines.

The oven is a gas-fired, double-decker, iron-sole plate oven with automatic temperature control.

An interesting item of plant in this department is the finely adjustable, electrically worked pastry roller, by which pastry of any thickness, from that of paper, may be automatically rolled.

The pickle cellar is all a pickle cellar should be . . . the temperature scientifically controlled ; the rows of pickling vats tidily arranged along the sides of the wall ; the floor clean and dry.

Delicatessen

A large range of fancy meats is another activity. Brawn, Beef, Ham and Tongue mould, Pressed Veal, Ox Tongues, Jellied Pork Tripe, Black Puddings, Yorkshire Hazelot (a strange-looking product to the southern eye—something akin to Haggis) and a host of other products were in course of production at the time of my visit.

The Pickle Cellar

The pickle cellar used in connection with many of the above-mentioned articles is everything a pickle cellar should be. The temperature scientifically controlled; the rows of pickling vats tidily arranged along the sides of the wall; the floor clean and dry. A very compact and ingenious arrangement for the regeneration and preparation of the pickle completes the arrangements of this department.

The Butchery Inspection department.

Cooling Rooms

The very ample accommodation for the storing of the different goods is exemplified by the presence of a cooling room in every department. Not that very much is stored, as there are 100 motor delivery vans going to and fro collecting finished products.

The Butchery

This is a busy department, occupied solely in preparing joints for the restaurants of the company. Magnificent joints of prime English beef were being prepared on the tables, while in the adjoining cool room more beef, shoulders and legs of mutton, and bacon awaited despatch. The Lancashire and Yorkshire people pride themselves on living well, and it is the claim of the company that for the modest price of 1s. 6d. a meal can be obtained in their restaurants which cannot be surpassed. Some idea of the magnitude of this department may be gathered by the fact that from 5 to 6 tons of meat per day issue from it.

Welfare

Great attention is paid by the company to the welfare of the employees. There are fine messrooms for both male and female staffs, and the recreation rooms are provided with a billiards table, dart boards and other accessories. Work at the factory starts early, and the girls bring their breakfasts to be cooked in the company's well-equipped kitchen, which must offer some food for thought by the cook, but I was assured that despite varying tastes and a surprising variety of viands to be handled everything ran smoothly.

White-tiled bathrooms with plunge and shower baths are available to the staff, and a drying chamber for working and private apparel adds to comfort.

In these days when holidays with pay is somewhat of a nine-days'-wonder, it is of interest to record that for the past twenty-eight years the company has accorded their workpeople all Bank Holidays, Good Friday and Christmas Day and six consecutive days holiday in the year with full pay.

The Board

The present Board is composed of the following: J. S. Hill, Managing Director; J. R. Pendlebury, Chairman; J. H. Yates, Secretary; J. Stanley Hill and A. Irlam, Joint Managing Directors; J. Irlam, J. Delsaux and G. Hough, Directors.

All the above have been old proprietors or have had exceptional experience in the trade.

The capital of the company is over half a million pounds, and for a number of years it has paid a dividend of 10 per cent.

SOME SUPPLIERS TO UNITED CATTLE PRODUCTS LIMITED

Refrigeration Machinery: *Lightfoot Refrigeration Co., Ltd.*
Steam Engine: *Marshall Sons and Co. (Successors), Ltd.*
Tin Press: *John Shaw and Sons (Salford), Ltd.*
CO_2 Recorders: *International Gas Detectors, Ltd.*
Automatic Stoker: *James Proctor, Ltd.*
Scales: *Vandome and Hart, Ltd.*
Double Seamers: *John Feaver, Ltd.*
Vacuum Seamer: *John Fraser and Son, Ltd.*
Mincers and Sausage Fillers: *Barwin Engineering Co.*
Mixing Bowls and Suet Shredders: *John Gardner and Son.*
Pie-Making Plant: *John P. Jackson and Co., Ltd.*
Oven: *Baker Perkins, Ltd.*
Cake Mixers and Egg Whiskers: *Morton Machine Co., Ltd.*
"Potex" Mixer: *John Hunt (Bolton), Ltd.*
Pastry Roller: *Morton Machine Co., Ltd.*

Potted Meats and Pastes

(*Continued from page* 231)

Ham product containing 67·8 per cent. of water was condemned as adulterated. It contained about 8 per cent. of starch or starchy matter. The Food Manufacturers' Federation, Meat and Fish Section, again considered the subject in 1936 by means of a questionnaire, and though a considerable difference of opinion existed, there was a substantial amount of support for the view that a limit for the moisture content might be set. On other points it was made clear that many of the firms interested in improving the standard of meat pastes were very doubtful if the institution of composition standards would result in such an improvement.

We must, however, take into consideration that the Departmental Committee on the Composition and Description of Food recommended empowering the Minister of Health to prescribe standards or definitions for foodstuffs. While holding the view that the case for the extension of standards and definitions to all foodstuffs is not made out, the opinion is expressed that "there are some articles in regard to which there should be no difficulty in arriving at a large measure of agreement with the manufacturers and other parties interested".[1]

The Food and Drugs Act, 1938, which comes into force in October of this year invests the Minister of Health with powers to issue such Regulations in respect of foodstuffs; powers which, though not entirely new, are wider than before. It is quite possible that some articles consisting of minced meats, whether mixed with other materials or not, may appear to be suitable subjects for an early exercise of these powers. It is immaterial whether possible Regulations take the form of standardisation or declaration of composition. In either case some limit would be imposed directly or indirectly on the latitude enjoyed in the absence of such regulations. It must not be imagined that such action, if reasonable and fair, is viewed with disfavour or dismay by manufacturers. On the contrary, the protection of the consumer against abuse of latitude is equally the protection of reputable trade.

REFERENCES

[1] Harvey W. Wiley: *Foods and their Adulteration*, pp. 51-52.
[2] *Food Research Report No. 10*, January, 1931.
[3] Manley and Sutton: *Analyst*, January, 1930, p. 11.
[4] Report of the Departmental Committee on The Composition and Description of Foods.

Danish Bacon Pig Marketing

(*Continued from page* 244)

Licences Must Accompany Pigs

Only pigs sent to the factory together with a licence are paid for at the price of the official quotation. Pigs that are not accompanied by a licence at present fetch about 30 per cent. less money.

This price margin regulates the supply of pigs satisfactorily. If more pigs are wanted the Committee raises the price payable for non-licence pigs nearer to the official price. If the supply of pigs is ample this margin is widened.

At the present time there are practically no non-licensed pigs. This is partly due to the increase in the British import quota.

POTTED MEATS AND PASTES

At present there are no technical standards for potted meats or pastes, but there has been considerable discussion on this matter during the last few years. This authoritative article by J. W. BLACK, *B.Sc., A.I.C.*, covers this as well as other aspects of the subject.

THE subject of potted meats and pastes has been the source of considerable discussion in the past and is likely to become one of much interest in the not distant future.

It may be dealt with from the point of view of composition, manufacture and legal requirements, and each of these aspects will be considered in the following study.

Potted Meats and Pastes

At the outset a distinct differentiation must be drawn between articles described as potted meats and as pastes, whether of fish, flesh, or fowl. The former are supposed to be as described, viz., potted meats without extraneous additions made with the object of increasing weight or otherwise affecting the nutritional value of the material. A product described as a paste, on the other hand, is a compounded article and as such would be subject to different standards if any standards should be imposed.

A potted meat might be permitted a minimum amount of binding material if this were necessary and of course an adequate amount of seasoning. A paste is known to contain a substantial though variable amount of ingredients other than meat or fish. By general agreement both terms apply to products designed to be spread on bread and put up in glass jars or tins of moderate size.

Composition of Pastes

The commonest types of paste are those named Salmon and Shrimp, Bloater, Anchovy, Lobster, Chicken and Ham, Turkey and Tongue, and various other combinations of the last four components.

With regard to the composition of these pastes, manufacturers in the past have been allowed considerable latitude in respect of these and other forms of comminuted meat products. Writing some years ago of American practice Dr. Harvey W. Wiley remarks, "There is apparently an understanding among manufacturers that the labels on potted goods are not intended in any way to indicate the variety of meat or principal meats contained in the package. In the absence of any . . . standard it is difficult to make any just criticism of the character of the potted goods upon the market". Further, speaking of potted beef he adds, "Potted beef corresponds more closely to the character of the meat named on its label than do any of the other potted products".[1]

It may be admitted that at the time Dr. Wiley was writing these words the position in this country was much the same, however much it may have since been modified. Manufacturers have felt themselves at liberty to apply one or other of the labels I have enumerated to compounded articles not consisting, as regards their meat contents, wholly or perhaps even mainly of those named on the labels; these were more or less identification marks of articles known to and appreciated by their consumers under that name, and possessing something of the expected flavour. The question of the price paid for the article in question has of course an important bearing on the justification of such procedure. It must be remembered also that the manufacture of certain pastes provides manufacturers with a convenient and legitimate means of making good use of cuttings and similar material arising from the larger and more important packing operations. This does not imply waste or inferior material nor that pastes are made of anything that comes to hand; on the contrary, the pastes are made to standard formulæ which provide for the incorporation of a proportion of these by-products in a suitable way.

In considering this question of composition it may be important to note that some formulæ may include an ingredient or ingredients apparently foreign to the main characteristic of the paste and added solely for the background of flavour which is imparted, and this legitimate admixture should be safeguarded.

Like other articles pastes vary in price, and this is usually admitted to permit and imply variation in composition and quality. In the writer's opinion, manufacturers to-day are careful to keep some true relation between the description and composition of the paste. In the higher priced brands the paste is a primary product, raw materials being selected for the manufacture of paste in the first instance; the composition of the paste so far as the meat components are concerned corresponding wholly or mainly to the description on the label. Cereal matter, rice, wheat rusk or sometimes soya flour may enter into the composition of the paste as a filler. In others, the function of a "filler" may be performed by a non-cereal ingredient.

The foregoing discussion of the composition may, as shown later in this article, be opportune.

Manufacture of Pastes

The manufacture of all pastes is of necessity similar in many particulars. Such operations as grinding, mixing, filling, and preserving are for the most part almost identical, but the preparation of the various components for these operations varies according to their character.

Technical food literature is richly provided with formulæ for making one thing or another; the columns of technical magazines contain many requests for such information, and it is usually provided. A doubt may be permitted, however, whether the information has proved as helpful to the enquirer as he hoped. The easiest way of treating this part of the subject would be to give a few formulæ for a variety of the more popular

pastes, rounded off with a little general information on the manufacturing procedure common to all.

In this article the method followed will be that of enunciating the general principles of preparing various ingredients for the rough mixing which obviously must proceed mincing or grinding.

Specific formulæ which might or might not be suitable to all cases will not be given.

In preparing such a paste as Chicken, Ham and Tongue, the ingredients will obviously include Ham and/or bacon (the latter lending an agreeable flavour); Tongue (which may be in part the cooked trimmings from tongue packing); and a proportion of chicken meat. There will also be spices or flavouring materials (which may include flavouring vegetables) and possibly a trace of colour. In addition a quantity of "filler" may be present either as cereal or possibly some form of meat other than those named on the label. In such a case, the raw or cured meats are first cooked until tender in a minimum amount of water, the tougher meats being added to the cooker before the more tender. Any flavouring vegetables or essences may also be added to the cook. When cooking is complete, the solid meats are withdrawn and allowed to cool. The stock is retained.

The cooked meats are then passed through a mincing or grinding machine and transferred to a mechanical mixer in which they are thoroughly incorporated with any seasoning or colour and a proportion of the stock derived from the cooked meats. The mixed paste is again passed through the grinding machine to impart the final degree of fineness and thereafter filled into jars or cans and processed.

Fish Pastes

In preparing a fish paste, such as Anchovy or Salmon and Shrimp and containing cereal filler, the procedure is slightly different.

The fish must be got into a condition in which the bones may be easily removed, by cooking if this is not already done and picking the flesh from the bones. In the case of anchovies, the fish are first cooked till tender and then rubbed through a fine sieve to remove bones; the highly flavoured stock being then employed to cook the rice which, when cool, forms an anchovy-flavoured rice paste. This paste may then be mixed in a trough with other ingredients and passed through the grinder. The paste is then treated as previously described.

The mixing and grinding machinery used are of types quite familiar to the meat trade, but two possibilities of improvement may be mentioned.

During mixing a considerable and variable amount of air may be incorporated in the goods, which it is difficult to get rid of in the actual jars before processing. It is possible, however, by conducting the mixing under vacuum to get rid of much of this air, and this method is followed in America with, it is claimed, distinct improvement in all minced meat products.

Fine Grinding Enhances Flavour

With regard to grinding, the flavour of any paste is enhanced by the degree of fineness of the material, and the writer has conducted tests on "homogenised" paste passed through a high-speed colloid mill with marked success in this direction. Independent opinion was unanimous on the flavour improvement so obtained. The particular homogeniser used in these experiments was a Hurrel Homogeniser, Size "OO", which is capable of considerable output, but other similar appliances will no doubt yield equal results. It must be admitted, however, that such processes add to the cost of production and, as well as the quality, the price of the paste would correspondingly increase.

Filling the Containers

The prepared pastes are filled into the familiar jars or other containers by means of the usual stuffing machine, which may be operated by hand or mechanically. Vacuum filling of pastes has been attempted but, so far as the writer is aware, not wholly successfully. The usual type of closure is the Phœnix Cap, though other forms of closure have been employed.

Processing is usually carried out at 240° F. for periods varying from 35 minutes to 1 hour according to the size of the container, though in the case of some pastes a lower temperature for a long period has been thought to improve the flavour.

Potted Meats

The preparation of potted meats need not be particularly described. They do not contain extraneous material except spices, and the meats are prepared as described under pastes. A small quantity of cereal may be present as a binder but not as a make-weight, and should be very limited in quantity.

Shrinkage of meat pastes in the jars may be due to different causes and result in the unsightly separation of either fat or water. The nature of the trouble itself suggests the remedy. This question was very thoroughly investigated by the British Food Manufacturers' Research Association some years ago, and much useful information on the point was obtained.[2]

Standards for Meat Pastes and Potted Meats

At present no legal standards exist for potted meats or pastes, but there has been considerable discussion on this matter for a good many years. As far back as 1927 the Meat and Fish Sections of the Food Manufacturers' Federation discussed the significance of the word "paste" and decided that it was a description "adequate for a composite article containing the actual constituents mentioned on the label".

The institution of a standard for these products was not considered at that time desirable in that it would not necessarily form a criterion of the actual quality of the paste. Since that time various proposals have been made for standards in potted meats and meat pastes.

From 1930 onwards recommendations[3] were put forward that the moisture content of potted meat should not exceed 70 per cent. and that added cereal matter should be absent.[3] This standard has been accepted as a guide by magistrates faced with the necessity of setting up their own standard. In 1935, a Chicken and

(*Continued on page 229*)

ULTRA-VIOLET RADIATION IN THE MEAT PACKING INDUSTRY

A description of remarkable researches on the effect of ultra-violet rays upon meat. How their bactericidal properties were scientifically investigated and how they were found to be capable of ageing beef is told by C. ROBERT MOULTON, Editor of *Meat*.

LIKE other food industries, the meat packing industry has as one of its chief problems the control of bacteria, yeasts and moulds. In this control the prevention of contamination in so far as is possible, the use of chilling and freezing, and the employment of such processes as curing, smoking, drying and canning are the main defences of the meat packer. Unlike some parts of the food industry, the meat packing industry must use atmospheres of high relative humidity, partly because it cannot help it and partly because such humidities are necessary to prevent loss of weight and deterioration of surface appearance of the product. In addition, certain germicides—for example, solutions of sodium hypochlorite and hot water or steam—are used to reduce the numbers of micro-organisms that remain on tools, machinery, tables and other equipment.

Early Investigations

Other agencies have been used to some extent in an attempt to control the growth of bacteria and moulds. Two of these are ozone and ultra-violet light. A few packing house offices have been furnished with air-containing ozone, and it has also been used to control the growth of mould on beef during ageing. Some early work reported by Lewis and Yesair, of the Institute of American Meat Packers, showed that when ozone is introduced into the atmosphere surrounding various meat products, concentrations varying from 0·27 to 0·47 parts per million of air imparted a cucumber odour and a metallic taste to most of the products studied. However, the beef product used in this experiment did not acquire these undesirable qualities. The higher concentration inhibited the growth of mould spores, but the lower one was ineffective.

In contrast to the above, work in Germany, England and the United States has shown that ozone can be used in the ageing of beef. Dr. Arthur W. Ewell, of the Worcester Polytechnic Institute, has used ozone in the ageing of beef. The humidity of the cooler was held at 90 to 92 per cent., and the temperature was maintained at 38° to 39° F. After filling, the cooler was closed at 3 p.m., and ozone was introduced in sufficient quantity to give 2·3 to 2·7 parts per million. The concentration fell rapidly, and more ozone was introduced to maintain the level above 1·8 parts per million for two hours. This treatment was repeated at 2 a.m. By 4.30 a.m. the concentration of ozone had decreased to the extent that it permitted workmen to enter the cooler. This process is now in commercial use.

A more promising approach to the control of bacteria and moulds has recently been made through controlled radiant energy, the bactericidal action of which is limited to wave-lengths shorter than 3,000 Ångström units with a maximum of 2,600 units. The peak for the produc-

An early installation of "Sterilamps" in a retail cooler where they served in maintaining good housekeeping conditions.

tion of ozone is about 2,000 Ångström units. The Lamp Division of the Westinghouse Electric and Manufacturing Co. in 1936 announced the development of its "Sterilamp" for the production of invisible radiation in a narrow band, 2,000 to 2,950 Ångström units. About 80 per cent. of the energy delivered by the lamp is found in the region of 2,537 Ångström units. This result is obtained by the use of tantalum electrodes, mercury vapour under low tension, and a special glass which is transparent to the desired frequency. The lamp consumes so little energy (ratings are for 10 watts) that the heat produced adds practically no burden to the refrigeration load. Dr. Harvey C. Rentschler and Dr. Robert F. James are responsible for the development of the lamp.

Early Applications to the Meat Industry

The first applications of this lamp were in beef storage rooms of wholesale meat dealers and in the ice-boxes and refrigerated show-cases of retail meat dealers. Two installations of the first type were made in the beef storage rooms of Nathan Schweitzer Co., Inc., and the Merchants Refrigerating Co., both of New York. Scherer and Co., of Mahwah, New Jersey, used the lamps in their refrigerated show-cases. The results obtained showed that beef could be aged in three or four days in place of as many weeks. The hanging temperature was 55° to 58° F. and 90 per cent. humidity or better was maintained. The meat kept its fine colour; there were no surface growths; shrink and trim were practically eliminated, and the beef was made more tender. In the retail installations growth of bacteria and mould was checked, odours were eliminated, and meat, including chopped meats, kept longer and was in "fresh" condition after many days.

These early results were of interest, but more detailed experimental proof of the value of the "Sterilamp" as a bactericide was needed. It had been shown that *paramecia* on short exposure to the radiations from the lamp quickly swelled up and met death by explosion. It had also been announced that the lamp had shown its usefulness in greatly reducing or even eliminating infections resulting from chest operations in hospitals at Duke University, Perth Amboy and two other cities. It had also been used to sterilise drinking glasses used in public refreshment establishments.

Bacteriological Evidence

Detailed evidence concerning the bactericidal effects of the "Sterilamp" was presented at the Mellon Institute in Pittsburgh on March 13, 1939. Dr. Rentschler, of the Westinghouse Lamp Division, reviewed briefly the early history of the use of radiant energy in the control of micro-organisms and the development of the "Sterilamp".

In order to study the effects of small doses of radiant energy from this lamp upon micro-organisms it was necessary to develop and adapt for this use a sensitive photo-cell which is affected only by radiation in the region of greatest bactericidal strength, which is in the region of 3,000 Ångström units. The use of this photo-cell was shown by using a "Sterilamp" and holding the cell in such a position that it would receive radiation from the lamp. When the cell was placed near the lamp, the "click—click—click" of the cell could be readily heard in the room. When the lamp and cell were separated by a greater distance the clicks were heard less frequently. Dr. Rentschler explained that the cell, while receiving the radiation at a constant rate in any position (but differing in different positions), stored up the energy until the condenser became charged to capacity, at which time the energy was "spilled" over and the click was heard. The number of clicks, then, accurately measured the total amount of radiation received by the cell. In this way an accurate determination of the quantity of ultra-violet energy to which bacteria and moulds were subjected was made.

Preliminary attention to temperature and humidity control in a meat-tenderising unit. The scientist is engaged in essential preparations prior to tenderising the meat in the presence of ultra-violet light from the "Sterilamp" (top right of picture).

Spraying the Test Bacteria

In attacking the problem of controlling micro-organisms, Dr. Rentschler pointed out that it was manifestly easier to destroy a few bacteria or mould spores rather than to wait for large colonies to form and then attempt to destroy them. The technique used in studying the effect of the "Sterilamp" upon bacteria was by means of a paint spray gun to spray a fluid suspension of the test organism into a closed chamber or box and then allow

the excess material to settle and the turbulence to cease. Petri dishes containing the proper medium for later growth of bacteria were then placed in the bottom of the chamber and left there for ten minutes. Such plates on later incubation showed uniform "takes" on all plates so exposed.

The next step was to spray bacteria into the chamber and expose them to ultra-violet radiation for 1, 2, 3, 4 or more "clicks". The quantity of radiation required to kill micro-organisms was then determined. As was expected, the "dosage" varied between organisms. The intensity of the dosage or exposure was also varied and, within certain limits, a lower intensity of radiation for a longer time was equal to a higher intensity for a shorter time (Intensity × Time = Quantity of Radiation). With the "Sterilamp", however, it was found that as the intensity was greatly decreased and the time of exposure exceeded a few hours, much less total radiation was needed to effect killing. For example, when *B. coli* was used, a quantity of radiation giving only 50 per cent. killing of organisms when a short exposure and high intensity were employed, gave 99·9 per cent. killing when the intensity was low and the time long (12 to 24 hours). It was also found that only 8 to 9 hours' exposure was required to kill when the bacteria were exposed at a higher temperature as compared to 19 hours at room temperature.

The results outlined above were interpreted as meaning that bacteria and spores have a vulnerable spot which develops at some stage of their life cycle. Radiation acting on them at such a time will show a very high percentage of kills. In fact, the energy required to kill when a flash exposure is used is 8 to 10 times that needed when exposure is over a longer period of time. Also intermittent exposure is just as effective as low continuous exposure.

A group examining cuts of "Tenderayed" beef. Drs. Rentschler (at left) and Beal are inspecting a choice T-bone steak, while Dr. Coulter (at right) is cutting more samples.

The parents of the "Tenderay" process, Drs. Coulter (at left) and Rentschler, are inspecting the "Sterilamp" at the conclusion of the tenderising operation.

Nascent Oxygen Formed?

Further experiments reported by Dr. Rentschler showed that air-borne micro-organisms are more readily killed than those that had settled upon the petri dishes. The same type of box and spraying technique were employed here, but the bottom of the container opened into two cylindrical chambers, one of which had a wall of cellophane which allowed ultra-violet light to enter. After spraying and settling had taken place in the upper container, the tops of the cylinders were uncovered and the micro-organisms were allowed to settle on petri dishes placed at the bottom. In one cylinder they were exposed to ultra-violet radiations. It took 5 to 10 times as much radiation to kill the organisms that had settled on the petri dishes in the chamber where the air was not exposed to ultra-violet radiations as was required where this radiation was employed.

Additional experiments were carried out with the lamp so placed that it could not directly act upon seeded petri dishes. The air was passed through the chamber containing the lamp and then through glass tubing bent twice at right angles into a bell jar containing the petri dishes. A positive indirect effect upon bacteria was found. Apparently there is a very minute amount of ozone formed (very much less than that found to be effective when the ozone is produced outside and then introduced into a chamber, as is done in the method employed by Ewell). This diffuses to the petri dish and kills the bacteria. Further experiments employing direct radiation proved that it was effective not because of ozone formed but as a result of direct action, for the effectiveness was just as great when air was made to flow from the exposed petri dish and out past the lamp as when the air flowed the other way. The action is not the result of ionisation of constituents of the air, since in experiments where the ions were swept out by an electrical attraction the action was just as great. There may be some sort of "nascent" oxygen compound formed which is unusually effective in the region where it is formed.

"Tenderay" Process of Ageing Beef

The applications of the "Sterilamp" to the ageing of beef have been developed at the Mellon Institute by Dr. M. D. Coulter, incumbent of the Meat Merchandising Fellowship founded by the Kruger Food Foundation.

At the meeting on March 13, Dr. Coulter presented the results of his investigations of accelerated ageing of beef by use of ultra-violet light, higher temperature and high humidity. Much experimental work had been done at Mellon Institute using a battery of coolers 8 feet by 10 feet. These were equipped with moisture and temperature control devices and four "Sterilamps" each. Meat was prepared and the carcasses were chilled in the usual manner. The carcasses were then removed to the coolers at the Institute, where they were hung, one side being held at the usual cooler temperature and humidity without the lamps being used. The other side was held in a cooler at 60° F. and 90 per cent. humidity with four lamps in operation. On account of the difference in thickness between typical rounds and chucks, it was found necessary to hang the hindquarters for 48 hours, while the forequarters were hung for 24 hours. In all cases air movement was also controlled. The quarters after this tenderising technique were again chilled. Later they were cut up, test steaks were selected, tests for tenderness were made, and quality and palatability tests were made on the cooked meat.

This was no casual test, for in one year 172,027 lb. of beef were processed by this method in the pilot plant. By the use of this process, time, trim and shrink due to water loss were greatly reduced, and the meat so treated was raised one grade in quality. Earlier experiments had shown that raising the temperature of the hanging room had lowered the time required for tenderising. A temperature of 48° F. gave little shortening of the time, 52° was better, 55° required 4 to 5 days for good results, 65° required less than 24 hours, while but 3 hours were needed at 85° F. The relative humidity was 85 to 90 per cent. Of course, the high temperatures and humidities used favoured the growth of bacteria and moulds.

To return to the process that gave such excellent results. In the 60° F. hanging room the "Sterilamps" were given 25 milliampères of current for 2 hours, and thereafter 10 to 15 milliampères were used. The air circulation was slow and about 10 per cent. of the air per hour was replaced with fresh air. Re-circulation of the air was necessary to give protection to the shaded side of the meat and new air was required to control odours in the box. Under these conditions there was a hanging shrink of as high as 0·1 per cent., while frequently slight gains were experienced.

Testing Tenderness of Meat

It has been stated that the "Tenderay" process gave an increase in tenderness. One way to test this factor is to remove identical pieces of muscle tissue from both right and left sides of a carcass. The meat is then subjected to the action of a penetrometer, or instrument which measures the pressure necessary to force the point of the instrument slowly into the meat. A higher reading indicates that more force is required and thus a tougher meat. By this means it was shown that meat not tenderised required a pressure of 200 units while the tenderised meat of the same muscle of the same animal required but 125 units.

This process is applicable to most grades of meat since the hanging time is short and the high humidity plus the "Sterilamp" maintain a fine colour on the surface and complete freedom from moulds, slimes and stickiness.

After discussion of the results presented by Drs. Rentschler and Coulter, the guests spent some time inspecting the pilot plant coolers and the carcasses in them which had been treated by the "Tenderay" process. Naturally the packing house chemists explored every crevice and hidden spot in the carcasses, using eyes, nose and fingers. No evidence at all could be discovered which would indicate any condition other than the best on this meat.

Experts Make "Blind Tests"

The guests were next asked to select steaks from right and left hindquarters of treated and untreated carcasses. Four such steaks were selected and cooked on electric grills in the laboratory. The guests were then asked to take part in a blind test for flavour and tenderness. Such tests must be carefully conducted in order to be of great value, and the tests referred to lacked complete conformity to the highest standard. Nevertheless it was very interesting to note that ten selections picked the tenderised steaks as better, while six selected the steaks not tenderised and three could tell no difference.

On March 14 Mellon Institute was host to a group representing the food trade press, at which time the results of the experimental and practical tests were again presented. On March 21 the Institute entertained a group of meat packing operatives and executives. A trip to view an installation of the "Sterilamps" and the "Tenderay" process in a meat packing plant was followed by a dinner at the Schenley Hotel. Later in the evening a programme broadcast over station KDKA reviewed in a dramatic sketch the history of meat tenderising and the results to be obtained by the use of the new process.

The meat packing industry will watch with great interest the more wide-spread use of this process of shortening the time of ageing beef which is applicable to more grades of meat than is the process now in use. The economics of the process will also need careful study.

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Subscribers who have not already applied for the comprehensive 8-page index to last year's issue are reminded that they may still obtain it from:

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BLOOD ALBUMEN

An analytical review of the evolution of methods of drying this highly delicate substance by

F. W. MARTIN, ***M.I.Mech.E.***

THE dehydration of substances sensible to heat, such as defibrinated blood, as well as the construction of suitable drying plants for this purpose, has long constituted an urgent problem in the industry. In the course of years, numerous solutions have been proposed, but only few complied in some measure with the existing conditions. Mostly their practical applicability was illusory, as the manufacturing costs were as a rule so high that an economic dehydration proved delusive, or the proposals were based on methods and procedure which were applicable only when a rather far-reaching damage of the final product would not inhibit its use.

The First Drying Plants

The first drying plants employed for the extraction of the superfluous moisture from blood were the well-known twin-cylinder dryers, and it must be admitted that these presented on account of the very efficient transmission of heat by means of metallic, steam-heated surfaces, the lowest specific consumption of heat. On the other hand, this advantage is considerably discounted by the fact that the temperatures existing on the surfaces of contact reach 100° C. and even more. Delicate substances, such as blood, etc., do not allow the application of such high temperatures without suffering a considerable loss of their essential characteristics. Consequently it was proposed to adopt the vacuum system and, spurred on by Passburg's famous investigations, vacuum cylinder dryers were constructed. The expectations and hopes have been realised only in a very modest degree, because, even if it is admitted that the application of a very high vacuum reduced the boiling point of the liquid to be dealt with below the so-called critical temperature which presents the most favourable conditions for bacterial or other decompositions, nothing was gained as long as, in practice, temperatures of 100° C. and more on the metallic surfaces of contact were unavoidable. Since, however, only steam-heated drying cylinders could be advantageously employed, the alternative plan of using cylinders heated with hot water was not practicable. It was then anticipated, in defence of the vacuum dryers, that the appearance of the well-known Leidenfrost's phenomenon would avoid any inadmissible superheating, but the partisans of this method overlooked that the temperature on the surfaces of contact must increase in the same ratio as the capacity of evaporation of the liquid decreases, or if the very fine layer of steam between surface of contact and liquid, which transmits heat only to a small extent, is difficult to obtain.

Cost of Vacuum Evaporation

As cylinder dryers deal as a rule with very fine layers of liquid only, the aforesaid advantages of this physical phenomenon are practically without effect. Moreover, the extraordinarily high manufacturing cost of vacuum dehydration rendered any economic extraction of the superfluous water impossible. Hence, particularly for cheaper products or smaller factories, this method was not applicable.

The next and logical step was to effect the transmission of heat with the aid of hot air, *i.e.*, the liquid blood to be dried was to be brought into contact with currents of hot air, in order to utilise the existing deficit of saturation for the extraction of moisture. As matters stood, this was the only way of taking precautions against inadmissible overheating.

Tunnel Dryers

The so-called tunnel dryers and, for smaller outputs, drying chambers, represented the first practical result of these theoretical considerations, and they are still to be found in many factories. In this case, the defibrinated blood is filled into numerous vessels, which are placed on special tray-trolleys and introduced into the aforesaid tunnels. Conveniently heated currents of air flow through the tunnel and absorb little by little the surplus moisture until the vessels contain nothing but a dry solid mass.

After the drying process has been finished the vessel must be emptied and the final product, *i.e.*, the albumen, is obtained in the form of irregular crystals. This product is very popular, as it can be easily dissolved and because during this process the blood does not undergo chemical changes on account of the moderate temperatures employed. This method, however, has various disadvantages. It requires much manual labour for the filling of the vessel and for the removal of the dried product. Furthermore, the filling requires a certain skill and experience, since the blood must be at the same level in all the numerous vessels in order to ensure that the duration of the drying is always the same. Moreover, the removal of the solid mass requires considerable physical strength, as the albumen is very hard. In view of the fact that the surface of the liquid blood exposed to the dehydrating effect of the currents of hot air is comparatively small, the extraction of the water takes place with extreme slowness; indeed, the drying in such tunnels lasts 15, 18 and even 24 hours, and sometimes, when the vessels contain much blood, even longer, so that a per-

manent, automatic operation is rendered impossible. Finally, these tunnel dryers are long, so that their erection requires very often modifications of the existing buildings, and their price is rather high.

Automatic Plant

Consequently, it was necessary to construct a drying plant which was entirely automatic; which avoided dangerous overheating of the blood to be dried; which effected the extraction of the humidity as quickly as possible; and which reduced the cost of manual labour. It was, therefore, not astonishing that engineers and chemists went back to the principle of the twin cylinder or film dryer, *i.e.*, to the principle of the enlargement of the wet surface, since the duration of extraction is diminished in direct ratio to the increase of surface. Hence, if it were possible to atomise the liquid blood, an enormously increased surface would be attained and the moisture extraction could then be carried through within a few seconds.

The atomising plants based on this principle have given very satisfactory results as regards mechanical reliability. They consist essentially of a large drying or spraying tower with an atomising or spraying attachment inside, consisting either of a rotating disc or a high-pressure pumping set equipped with a suitable spraying nozzle. The dense fog of atomised blood inside the tower comes into contact with currents of hot air, the temperature of which is round about 120° C., so that evaporation takes place instantaneously. Indeed, the expulsion of the superfluous water is done within a fraction of a second, and a continuous stream of fine powder falls downwards.

The instantaneous evaporation reduces the temperature, so that the atomised blood particles are not overheated, but the extraordinary high price of these plants, the considerable cost of production, the high consumption of steam and energy militated against their popularity, and only a comparatively small number have been built. They require voluminous foundations and, on account of the height and diameter of their towers, special buildings for their erection. Finally, as the velocity of the currents of hot air inside the tower is rather high, these plants need very expensive filter plants for the blood powder carried away by these currents.

The Albumen Obtained

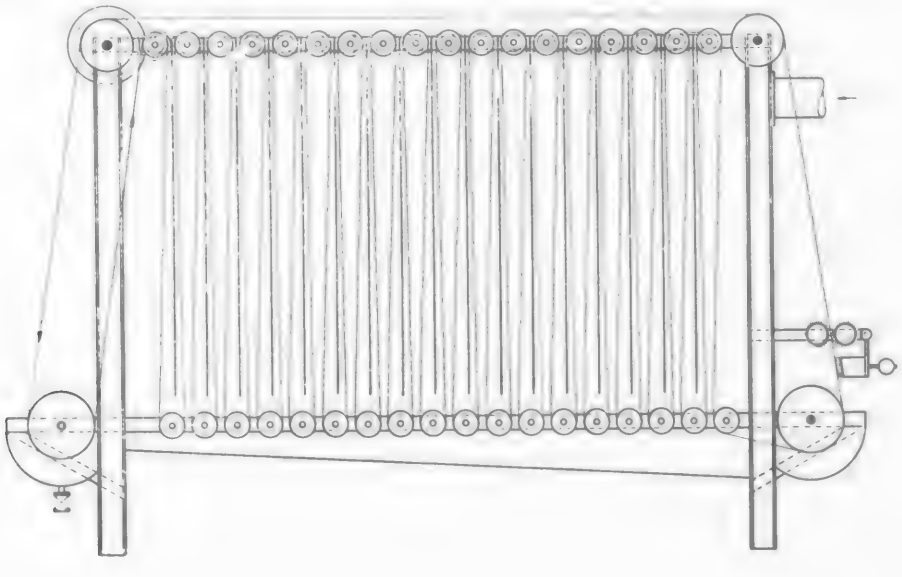
One of the greatest disadvantages, however, is that the final product is obtained in the form of a fine, nearly impalpable powder, the solution of which in water presents considerable difficulties on account of the large quantity of enclosed air bubbles. This powder easily clots and forms lumps when added to water and, therefore, requires heavy and expensive mechanical agitators. These plants are only economic when designed for large quantities of defibrinated blood, and not for the output of small or even medium-sized factories.

All these disadvantages, of the tunnel dryers as well as of the atomising plants, encouraged the engineers in the industry to construct an apparatus which combined the advantages of these aforesaid systems, *i.e.*, that they be automatic; continously operated; giving rapid evaporation and a crystallised product; capable of avoiding high temperatures. Other requisites are that this new plant should not require much space, no foundations, and should be cheap and handy.

The Vibration Rapid Dryer

This dryer complies fully with all these requirements. The following description of its constructive details indicates the technical elements of which it is composed and the diagrammatic sketch explains the design.

In order that this apparatus should occupy only a very limited space and be erected without any foundations, a very compact design was sought. The whole drying mechanism is suspended in a robust scaffolding of structural iron which is hermetically lined with sheet-metal. The dryer is equipped with an efficient air heater



A diagrammatic sketch showing the design of the Vibration Rapid Dryer.

combined with a medium-pressure blower. The air heater produces the necessary drying air and the blower forces the hot air through the dryer labyrinths. Provision is furthermore made for an endless belt of a special steel wire cloth, which travels in numerous vertical coils through the dryer. In order to ensure a very efficient taking-up of liquid blood a special shape of mesh is used. This endless belt is suspended between two rows of rolls, and travels round them. The upper system of rolls drives the belt, while the lower row is provided with elastic bearings in order to absorb possible inner tensions of the belt. The upper row is equipped with steel-toothed wheels and a driving chain. The wire meshes of the belt are of a special shape, so that their cross-section, when the belt is at a standstill, amounts to approximately 16 to 18 mm^2.

On its front side the apparatus is equipped with a special trough, surrounding the plunging drum, and the vibration belt goes round this drum before it enters the dryer. On account of the vertically movable bearings of the lower row of rolls and of a patented agitating mechanism, the belt begins to vibrate as soon as it begins to move, and these vibrations are transmitted to the wire meshes with an extraordinarily high frequency.

Patent Brushing Device

On the rear side of the dryer a patented brushing device combs the belt thoroughly with the aid of special steel brushes, and below this mechanism another trough collects the dried product. On demand, this collecting trough is equipped with an automatic conveying worm so that the final product can be brought to the bagging station. The dryer is equipped with an exhaust pipe for the saturated air as well as with the necessary measuring instruments for the exact control of temperature, moisture content of air, etc.

Admission of Air

In order to regulate the admission of fresh air the Rapid Dryer is provided with a special regulation valve connected to a patented air circulation labyrinth, so that the already heated and half-dried blood gets towards the end of the dehydration only in contact with partly saturated and partly cooled air. As it is intended that this dryer be easily portable, it is equipped with four supporting feet, which can be fastened on the floor with simple bolts, and therefore foundations are completely superfluous. The maximum height of the apparatus amounts to approximately 3 metres, the length is not more than 5 metres, and the width is round about 2·75 metres, and therefore practically any large room is suitable for the erection of this machine. The aforementioned steam-heated radiator is provided with a modern steam-trap and with connecting flanges for the steam admission pipe. The above-mentioned toothed-wheel chain is connected with a fast and loose pulley for the drive of the belt. A special waste-air filter is not necessary, as the velocity of the currents of air inside the dryer is rather small.

Drying the Blood

The drying is done as follows: the liquid blood flows continuously through a pipe to the trough on the front side of the machine. The vibration belt which goes round the plunging drum dips into this trough, so that the meshes of the wire cloth are filled with defibrinated blood. The special shape of the meshes of the belt ensures that the blood is conveyed through the dryer in the form of very fine and thin bubbles or membranes between the meshes. The belt now enters the dryer and travels through the drying zones in vertical coils, so that the fine membranes get into intimate contact with the currents of air, which have been heated in the steam-heated air heater and which flow through the labyrinths of the dryer.

On account of the patented suspension and the likewise patented agitating mechanism, the belt begins to vibrate vertically, as also do the meshes of the wire cloth belt. Consequently, the cross-sectional area of the meshes varies with enormous frequency per second and the fine membranes of blood begin to vibrate, with the result that the particles of hot air passing along the belt are subjected to periodical compressions and rarifications, thus intensifying, on account of the vacuum effect, the velocity of evaporation.

The Second Stage

After the blood has been partly dehydrated, the belt enters the second zone of dehydration, where the residual moisture is extracted by means of already half-saturated air in order to avoid dangerous over-heating. This means that towards the end of the drying operation the blood is exposed to an advantageous refrigeration.

The perfectly dry belt leaves the dryer at the rear side and travels continuously through the brushing attachment, which gently removes the dried substance. Before the dried blood falls into the collecting trough it passes a powerful magnet which retains any metallic fragments which may have come from the brushing mechanism.

The dried blood albumen is obtained in the form of a powder of an amazingly uniform structure.

Little Power Necessary

The consumption of energy is very small, approximately 3 h.p. are required to drive the blower and 1·5 h.p. for the drive of the conveying belt. The consumption of steam amounts to approximately 1·9 to 2 kg. per kg. of extracted water. As this dryer works continuously, no attendance is required and one man can control several of these machines and still have time enough for other work. The whole process only lasts about eight minutes and the solubility of the crystallised albumen thus obtained is astonishing. Exact and numerous analyses have shown that it is easily possible to guarantee 99·5 per cent. of solubility.

In view of the advantages heretofore enumerated and further stressing its cheapness and sturdy construction, this automatic machine should gain wide acceptance by those concerned.

SAUSAGE MANUFACTURE AND CONTROL

The author of *Small Goods Production*, FRANK GERRARD, who teaches embryo butchers at The Smithfield Institute, here gives some eminently practical hints on sausage making.

THE WHOLE SECRET of developing a successful sausage output is based upon standardisation. Theoretically, provided that a fair degree of intelligent application is given to the problem, the attainment of a consistent product may appear to be reasonably simple. In practice, however, such is not the case, and although many of the ingredients used may conform to a relatively high standard and the individual operations be rigidly controlled, the most important constituent—the meat—must remain a somewhat variable quantity.

Changes in Muscle Tissue

In this respect the most important changes in the muscle tissues are associated with the age, sex, and general condition of the animal. From pre-natal existence to the time of chemical maturity, there is a decrease in the relative water content, accompanied by an increase of protein, salts, and, normally, fat. With emasculated males, and females which have not produced young, there is a tendency to lay up large stores of fat. With breeding stock, particularly bulls and cows, the carcases generally possess a very poor deposition of fat and the texture of the lean tissues is harsh and dry.

As water content markedly affects the texture and appearance of the finished sausage, the amount present in the flesh employed in its manufacture is of paramount importance. In lean beef the moisture content may be as low as 70 per cent., whereas in some other materials (tripe, etc.) the figure may exceed 80 per cent., and with fat generally the percentage is very small.

The skilled operator will instinctively adjust variations between the various meats, but unfortunately such men are few and far between, and under normal factory conditions it is better to utilise one form of meat and to depend upon the experience of the buyer to obtain a fairly consistent article.

Binders

The binder is an essential part of English sausage, and it is a matter of some doubt as to whether or not an all-meat fresh sausage would meet with a favourable reception in this country.

The chief points to consider in choosing a binder are: (*a*) Absorptive power. (*b*) Freedom from fermentation. (*c*) Neutral flavour. (*d*) Suitable colour. (*e*) Reasonable price.

Bread, rusk, rice, cornflour, farina, soya bean flour, milk powders, and flour have all been used.

Bread

Many manufacturers pin their faith to bread and in some cases even bake their own, thus ensuring a suitable product for their purposes. It must, of course, be stale before it is utilised, and it should be borne in mind, when costing, that a 4-lb. loaf can lose up to 8 oz. in weight over a period of three days. Mould must be guarded against and individual examination of each loaf after cutting across is essential. Other things being equal, sausages prepared from bread will have a shorter commercial life than those made from rusk. When a loaf is sufficiently stale it should absorb 1 lb. to 1 lb. 2 oz. of water per lb. of bread when intended for ordinary fresh sausage. After soaking, the excess moisture can be removed either by a hand-operated press or, if turnover justifies it, a centrifugal extractor. The latter method will produce a consistent article and the process is of course greatly accelerated.

Rusks

There is a wide choice in the matter of rusks, as regards price, grade, and absorption. The absolute absorption figure for some types is in the region of 3 : 1. It is inadvisable to use such a figure commercially, and generally 1½ parts of water to 1 of rusks by weight is a good basis. If price is important a figure of 2 : 1 can be employed, but prolonged soaking is advisable. Should the rusk be saturated, any free fat cooking out from the sausage cannot be absorbed and shrinkage will result. For some products a pink rusk is preferred, and these can be obtained ready coloured from various manufacturers. Some sausage manufacturers, however, prefer to add a vegetable dye to the water in which the rusks are soaked and thus adjust the colour to their requirements. Most rusks are dry and reasonably sterile when

Experimental Sausage Plant installed at The Smithfield Institute.

received, but they may be contaminated by storage in a damp place. Galvanised-iron bins with tight-fitting lids provide a satisfactory container in the factory itself, while the main stock should be stacked away in a dry store. Having found the type of binder that appeals to the public (as evidenced by sales), it is false policy to change on account of slight price fluctuations.

Rice

For such articles as Polonies, Hog Puddings, Meat Rolls and Galantines boiled rice is a good binder. In the case of the foregoing, granulated or rice flour is generally used. Some of the softer rices contain a high starch content and consequently a fairly firm texture can be produced. For fresh sausages an unpolished Patna rice will produce a very satisfactory product and as it will absorb three to four times its weight of water its cost as used is low. If any quantity is to be boiled, a steam-jacketed pan becomes a necessity. After cooking, the rice can be placed in shallow moulds of (say) about 20-lb. capacity and when cool it can be stored in a refrigerator until required. To offset the dead-white colour, a small quantity of colouring matter can be added to the water in which it is cooked. As the binder is practically saturated, it is advisable to add a small quantity of dry cereal when chopping down the meat.

Cornflour

This is probably an ideal substance for the many types of Luncheon Sausage and its flavour blends particularly well in the case of beef products. In practice it is found to "sour" less readily than many other binders. This latter characteristic makes it invaluable in the manufacture of some Continental sausages which are not cooked.

Potato Flour

This is reserved almost entirely for cooked sausage and its use in any quantity in the fresh varieties will produce a springy, resilient fried sausage. Its chief disadvantage is the difficulty of keeping it in suspension. Its colour makes it particularly useful in "Pork Luncheon", and provided that the quantity employed does not exceed about 15 per cent. of the total chopping, the result will be entirely satisfactory and it will take an expert to detect its flavour.

Soya Bean Flour

From one dietetic aspect, *i.e.* protein content, it can be said within limits to replace meat; in fact, the flavour of the flour is somewhat akin to beef itself. Its phosphoric acid content is claimed to exercise a preservative action. Care should be taken in purchasing to ensure that the flour is guaranteed free from rancidity. Many firms introduce a small quantity of the dry flour rather late in the chopping process to absorb any free fat and to increase the binding properties of fresh sausage meat.

Milk Powders

Milk powders are used extensively in the United States and their inclusion tends to produce a rich, smooth article. With fresh sausage, "reconstituted" milk as a substitute for water produces a very desirable pork sausage with a good commercial life. In fact, it would appear that the slight formation of lactic acid tends to retard the growth of putrefactive organisms. The consumption of sausage in the United States has reached a very high figure and doubtless its popularity can be greatly attributed to the Federal Regulations governing the quality of cereal to be employed. For example, a "Pure Pork" sausage must contain *only* pork and seasoning matter. In many States the cereal is limited to 2 per cent. and in most cases packages must be branded accordingly. Though it is doubtful if such a rigid restriction would meet with general approval in this country, either from manufacturer or consumer, I feel confident that some legal standard restricting the excessive use of cereal in sausage and meat products would eventually benefit the reputable manufacturer.

Flour

Ordinary flour has its adherents, but its flavour is somewhat difficult to cover, especially if it is used in large quantities. Its use is almost entirely restricted to cooked sausage and meat packs.

Curing

As a general rule dry-curing is preferable to pickle cure for meats intended for sausage. In the former, meat juices are retained and the quantity of cure taken up can be more easily controlled. Temperature is important; the higher the temperature the more rapid the rate of cure, but the greater the risk of spoilage.

About 36° to 40° F. is usually preferred and to shorten the curing period the meat is broken down on a mincer using a one-inch plate, prior to packing down with curing mixture. A typical formula is 3 lb. of fine salt, 5 oz. of granulated sugar, and 3 oz. of sodium nitrate per 100 lb. of meat.

Approximately 72 hours' curing is sufficient and the addition of a small quantity of used pickle will accelerate the nitrate-nitrite change. For pork meats the quantity of salt may be reduced to $2\frac{3}{4}$ lb. During the curing process the exposed surface of the meat in the containers should be protected by covering with parchment paper. The practice of curing in the actual sausage containers is not favoured in this country.

Sausage Containers

For fresh sausages hog casings and sheep casings are generally employed. Periodical sampling is advisable. Hog casings are usually purchased in bundles of approximately fifteen pieces to measure three hundred feet, and they should average as near as possible twenty feet per piece. A tierce consists of three hundred bundles, and the three commonly accepted grades are "narrow",

"medium", and "wide", though a considerable extension of these grades is made by certain houses. Sheep casings usually run from narrows (under 17 mm.) to wide (24 mm. and over). To test, select five bundles from various parts of the barrel, shake off the surplus salt and soak for about one hour at 70° F. Separate each strand, measure, and then find the number of pieces and total yardage per bundle. Examine for odour and colour and finally fill with water, test for holes and check the diameter.

Synthetic Containers

Of recent years artificial casings have received the very serious attention of the trade. Their appearance and cross-section are definitely uniform and though natural casings are carefully graded they cannot be standardised. With the former it is possible to have advertising matter or a trade name printed on the casing, and thus derive the benefit of handling a branded product. In this country these casings are used almost entirely for cooked sausage. Some operators still maintain a certain prejudice towards them, due possibly to their characteristically conservative outlook and the fact that a little more care is necessary in handling the synthetic product.

In Germany, manufactured casings of animal origin are being prepared, and samples examined appear to be satisfactory. For such products as liver sausage, Salami, etc., natural casings will probably always hold their own.

Costing

Periodical test costing should be taken. Below is a specimen sheet suitable for the average factory. Such a procedure is extremely valuable in checking up waste and the copies should be filed for reference.

MANUFACTURING DEPARTMENT.

NAME: Beef Sausage. DATE: 1st July, 1938.

	£	s.	d.
Weight of Meat, gross flank 90 lbs. at 3d. per lb.	1	2	6
Weight of Binder, fine rusk 18 lbs. at 3d. per lb. ...		4	6
Seasonings, 2 lbs. at 1s. 3d. per lb....		2	6
Container, 1½ bundles hog at 8s. per bundle ...		10	0
Other materials at			
,, ,,			
,, ,,			
Total cost	£1	19	6

RECIPE:
72 lbs. meat (approx. ¼ fat)
18 lbs. dry rusk
36 lbs. water
2 lbs. seasoning

Stock seasoning used:
18 lbs. fine salt
4 lbs. ground white pepper
7 ozs. cayenne pepper
6 ozs. nutmeg
6 ozs. ginger

Method of manufacture:
Meat prepared. Stored at 40° F. overnight. Broken down on half-inch plate of mincer. Meat transferred to bowl chopper followed by seasonings and soaked rusk. Chopped fairly finely and filled to link six to the pound. Cooled at 40° F. prior to delivery. (Colour inclined to fade, seasoning and texture satisfactory, slight tendency to shrink on cooking.)

Final weight, 126 lbs. (2 lbs. loss); nett cost per lb., 3·75d. approx.

Australian Peach Canning

(*Continued from page 243*)

Exhausting

The cans are now full of peaches and syrup and are open at the top. They have to be precooked before sealing, so that when they finally cool a vacuum is formed. This precooking is done in stainless steel steam exhaust boxes, through which the cans are automatically fed. They are all controlled by Recorder Controllers. These instruments keep an accurate control operating under actual service conditions to within ¼° F. This ensures that the temperature has been maintained, and the speed of the machinery makes certain that the time of exhaust is constant.

Capping

After leaving the exhaust box the cans are capped at 60 to 70 per minute. These perform three operations. The first lowers the cap on to the open can with a vacuum-operated mechanism and clinches it lightly on, so that the can may be lifted into the rollers for the two final clinching operations without spill. The caps are lined with sealing compound now made in Australia.

Automatic Cooking

After sealing, the cans pass through automatic cooking lines, and these are also temperature controlled by similar equipment to the exhausters. They then pass through counters and a water cooler to the warehouse, where, stacked in trays, final cooling takes place.

The following day specially trained "rappers" test each can for soundness by rapping it with a small drumstick. The metal of the cap, held in tension by the internal vacuum, gives a sound different from the caps of any can which by some mechanical fault have not drawn a vacuum during cooling. The percentage of these cans is very, very small, but the rapping is an additional safeguard and shows up faults at once.

Storing Cans

The cans are stored, unlabelled until required, in huge "bins". Stacked like the stones in the wall of a building, literally millions of them, in large warehouses, await export or Australian orders. When these arrive, labelling machines are run up in front of the stacks and the cans run through the machines, each having a label applied in the process. These machines work at a fast rate, and thousands of cases per day can be labelled by each one. Labels are printed in Sydney and are a tribute to the craftsmanship of Australian printers.

When export fruit is packed it is done under the supervision of an inspector from a special Commonwealth Government branch, who also attends when labelling is in progress for export orders. The majority of Australia's export of canned fruit is shipped to the United Kingdom, although a considerable quantity goes each year to Canada and New Zealand.

The building of Burrinjuck Dam some twenty-odd years ago and the resultant irrigation converted a barren waste into a paradise which produces thousands of tons of luscious fruits for Australian wineries and canneries.

F. C. ELSWORTH here describes the handling of peaches.

The Burrinjuck Dam.

AUSTRALIAN PEACH CANNING

YEARS AGO what is now the Murrumbidgee Irrigation Area in New South Wales, Australia, could have almost been called a barren waste. The building of Burrinjuck Dam some twenty-odd years ago and the resultant irrigation have converted the area into a paradise in comparison. It now produces thousands of tons of luscious fruits for Australian markets, wineries and canneries.

Canning Fruits

A large proportion of the canning fruits are railed 400 miles to Sydney by a specially fast fruit train which makes the journey overnight, giving fresh sun-ripened fruits to the Sydney canneries of H. Jones and Co. Pty., Ltd., packers of the famous IXL brand of canned fruits, jams and many other food products.

Approximately 5,000 tons of fruits are handled annually by the Sydney canneries under a scientific system of orchard organisation and manufacture, and thousands of tons from other districts. In addition to the Sydney factories, the company operates large canneries in other States of Australia, in New Zealand and South Africa; a total of ten major canning and jam-making enterprises.

Each fruit is treated as closely as possible to its source of supply, enabling fresh fruits to be used for raw material. Thus, pineapples are handled in Queensland, peaches, apricots and other temperate fruits in New South Wales, and the same fruits in Victoria, with the addition of pears and berries, and in the most southern State, Tasmania, cold-climate fruits such as berries, apples, pears, apricots and the like are processed on a very large scale. The New Zealand and South African factories process a wide range of canned foods.

The Sydney Factories

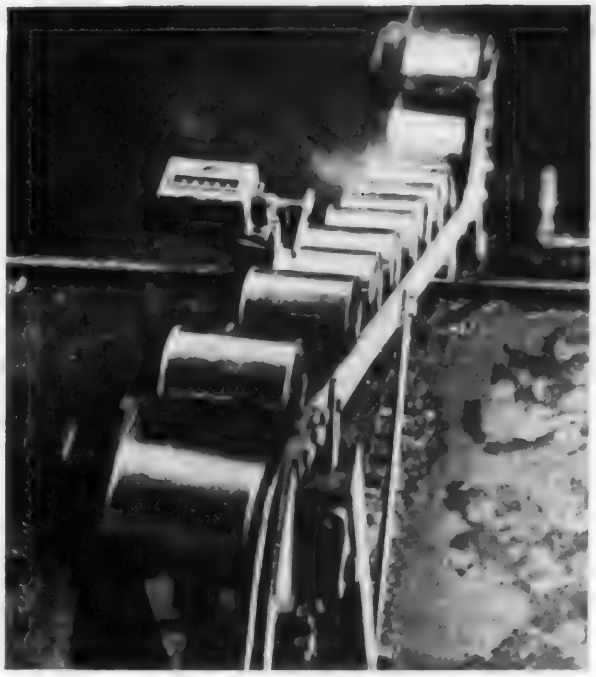
To return to Sydney operations: an inspector is stationed on the Murrumbidgee Irrigation Area 400 miles away, and he is responsible that each consignment of fruit is suitable for canning. He also visits the farms and helps growers as much as possible, and organises the quantities railed to Sydney to keep the canneries fully but not over supplied.

The fruit arrives in Sydney early in the morning, and deliveries at the cannery commence before the canning girls arrive. The peaches used are of the clingstone variety, as only these withstand the mechanical handling necessary in a modern cannery. They are of a special variety, noted for their flavour, sweetness and colour, and have to be grown on long-term contracts to make sure of adequate supplies for the future. They are again inspected on arrival at the cannery and delivered to the pitting benches, where the stone of the peach is cut out by girls with a specially shaped knife called a "pitting spoon".

The two halves of the peach fall on a moving belt running in front of the girls and which quickly conveys the fruit to the peeling machine. An average fast girl can "pit" about 40 bushels of peaches per day in this manner, while the champions can do anything up to 65 cases, which would weigh about a ton and a half. A girl doing 40 per day would earn about £5 per week without any overtime work.

Peeling Machines

The halves of the peaches tumble into the peeling machine and emerge, without their skins, perfectly smooth at the other end. They make a wonderful picture tumbling out of the high-pressure water-washing



A counter records the number of cans packed on each canning line.

sprays, each half golden and smooth as glass. About 2,000,000 of these halves pass this point every day.

After the skin has been removed a belt takes the halves past a long line of inspection girls. Faults in the fruit are looked for, and if any are noticed the peach is removed from the line.

Grading

They are graded for size in an automatic machine, which consists of about seven perforated plates of different sizes. The first holes are the largest, and consequently the big peaches are first removed, all that will pass over these holes sliding on to the next tray. All the trays shake horizontally and are on a small slope to help the peaches through the machine. The grader separates the halves with remarkable accuracy, as the fruit is firm, and thus will not be forced easily through a hole too small for it.

Each size passes down a chute to mechanical conveyors, which take it to its correct place in the cannery. Different sizes are needed for each count in the can, and some sizes for cans of particular size. These are delivered automatically to the canning lines, where they are being packed into cans.

Some peaches are too large for the cans usually bought, and these are cut up in a machine for "IXL Sliced Peaches". This machine consists of a series of rotating circular stainless steel blades arranged in a semicircle, with their edges almost touching at one side and splayed on the other. The peach halves are pulled through the close side of these blades by a belt, and this cleanly cuts up into equal slices. These slices are also automatically conveyed to the canning lines, where they are packed into the cans.

When the halves or slices arrive on the belt at the canning line they are delivered into enamelled or stainless steel sinks, which are being continuously flushed with running water. Here they are packed into the cans by girls, who inspect the fruit in the process. This is the final of many washings and inspections which the fruit has received.

Sugar for Syrup

From this department the cans full of fruit are conveyed to the automatic syruping machines. These are supplied with boiling syrup made from finest white crystal sugar. The sugar is Australian made and is all produced with white labour. The main source of supply is the Queensland canefields, which run in a belt over a thousand miles long in the coastal area of Australia's northern State. The mill sugar, brown in colour, is mostly brought to one of the large refineries in the southern States, where the white crystals are produced, and these are delivered in bags direct to the cannery.

When the sugar arrives it is hoisted to the syrup platform where, in shining stainless steel tanks, it is converted into syrup with filtered boiling water. It is again filtered on its way to the automatic syrupers, and before use is tested for strength by a works chemist.

Automatic Syrupers

The automatic syrupers consist of a rotary reservoir of hot syrup with about eight valves leading from the bottom. The reservoir revolves and, as it does so, the cans filled with fruits are fed under the valves. Each can presses up on the valve and opens it, allowing the syrup to fill the can. When this is full, of course, the syrup ceases to flow, and the machine is timed to lower the can off the valve after a sufficient period for filling has been allowed. As the can is lowered off the valve its own spring closes it and prevents any more syrup coming out until a new tin is fed underneath it on the next revolution.

(*Continued on page* 241)

Filling sliced peaches into cans.

DANISH BACON PIG MARKETING

CLIFFORD SKERTCHLY

ONE of the principles of the Bacon Industry Act is to divorce the price of pigs from the price of bacon; in Denmark the pig price is based on the price of Danish bacon on the London market. Producers and curers work together in Denmark with a close degree of co-operation that gives a smoothness which is the envy of every branch of the English bacon industry.

Several factors contribute to the happy relationship between farm and factory in Denmark. Most of the factories—62 out of a total of 84—are co-operative factories owned by the farmers themselves. The others are privately owned, a number belonging to the English Co-operative Wholesale Society. The farmers' co-operative factories handle about 85 per cent. of the Danish pigs.

Curing Costs Low

These 84 factories cured in 1937 a total of 3,699,869 pigs, an average of more than 44,000 pigs per factory, or 900 pigs per factory per week. Britain has to-day 583 registered curers under the marketing scheme, and the maximum number of pigs eligible for Government subsidy is 2,100,000 pigs per factory. It is not surprising, therefore, that curing costs per pig are much lower in Denmark than in this country.

In Denmark, as in this country, the curer pays the cost of transport; but no Danish farmer is more than 16 miles from the factory to which he sells his pigs, whereas the average distance in this country is about 115 miles. Danish pig producers suffer no loss through shrinkage in transit to the factory.

Nearly every Danish farmer produces pigs, but he does not enter into a contract as under the English marketing scheme. Farmer members of a co-operative factory sign an agreement that for a term of years (usually seven) they will market the whole of their pigs (except those consumed on the farm) through that factory, and will conform to its rules and conditions.

Official "Bacon Quotation"

Every week the official "bacon quotation", representing the price of Danish bacon in London, is determined; and the price payable to the Danish farmer for the pigs he delivers to the curer during the week is based on that quotation.

On March 31 last the bacon quotation was 99s. to 103s. per cwt., and the price payable for Grade 1 pigs was 184 ore per kg. (about 16s. per score lb.) deadweight, including head and feet. On April 6 the quotation was 92s. to 96s. per cwt., and farmers received about 15s. 3d. per score lb. for a Grade 1 pig; 15s. 1½d. for Grade 2; and about 15s. per score lb. for Grade 3.

Farmers' co-operative factories pay their members each week between 90 and 95 per cent. of the calculated price of their pigs (based on the official quotation) and the balance is held over until the close of the yearly accounting period. The 22 private and English-owned factories also pay the pig producers weekly on the basis of the official bacon quotation. They pay a slightly higher weekly rate than the Danish co-operative factories, but make no distribution at the close of the accounting period. Over the entire year there is little difference between the prices paid by the co-operative societies and the private companies.

No Problems of Allocation

Denmark is not troubled with problems of allocation or of pigs sold on the open market. The factories vary in size according to the area from which they draw their pigs. Every factory has an economic throughput and the price paid for pigs is remunerative both to large and small producers. Many Danish farmers produce only ten to twenty pigs annually.

Danish farmers contract to sell *all* their pigs to the factory. The fresh pork market in Denmark is small and is supplied by the factories through commissioners for the various districts. No pigs are killed for the fresh pork market below bacon weight. Some, in fact, exceed bacon weight.

The British bacon import quota has had important effects in Denmark, where production is now only about half what it was in 1932.

Pig production is now regulated so that the price of bacon shall not be depressed too seriously. Every farmer must have a special licence if he wishes to obtain the full official price for his pigs. These licences are issued by a committee of producers and curers appointed by the Danish Minister of Agriculture. The chairman is a farmer.

This committee determines the number of pigs required during the year and issues licences accordingly on the basis of a licence for every pig. These are allotted in various ways. Small farms are allotted two licences and large farms six. One licence is also allotted for every 1,000 kroner value of the land (excluding buildings) up to a value of 40,000 kroner. Beyond that figure the number of licences is at a smaller rate.

A number of licences is also granted corresponding to one-seventh of the number of pigs produced in the preceding year; and licences are also granted according to the quantities of skimmed milk, buttermilk and whey returned to the farm by the creamery in the preceding year.

(*Continued on page 229*)

STUDIES IN NUTRITION

Guiding Principles for Studies on the Nutrition of Populations, *Dr. E. J. Bigwood. 132 pp. 6s. net.*

This book has been issued by the League of Nations. Its purpose is to indicate what points must be taken into consideration in conducting nutrition surveys of populations so that the work may be carried out on sound lines and the results presented so as to render comparisons simple. All experimental workers in this field appreciate the need for such comparison, and a genuine effort is made to fulfil the need. In many cases, however, its possibilities cannot be used fully because the investigations concerned have not been planned in a manner which ensures comparability. Because of this, much patient, industrious labour has been wasted in previous investigations, and some standardisation of methods has become essential, but this need not interfere with originality of research.

Dr. Bigwood describes methods of studying the physiological problems connected with nutrition which are suitable for application to population groups of varying size and homogeneity, from groups of a few persons to a whole nation. The homogeneity or heterogeneity of the groups is considered from physiological, demographic and social points of view.

Probably the most valuable section is that dealing with proposals for facilitating the various comparisons. Statistics are always doubtful, but comparisons need not always be odorous (in spite of Dogberry), and this book may render valuable statistical evidence on many important comparisons. At any rate, it is not " Much Ado about Nothing ".

T. H. F.

MILK CHEMISTRY

The Chemistry of Milk, *W. L. Davies, Ph.D.(Cantab.), D.Sc. (Wales), F.I.C. (Second edition.) xiv+534 pp. 25s. net.*

The rapidity with which a second edition of this work has been called for is a measure of its appreciation by research workers and chemists engaged in dairy chemistry, for whom it has largely been written.

The author, who is well known as an authority on his subject and is, by the way, a valued contributor to FOOD MANUFACTURE, in his preface to the new edition points out that he has made no change in the method of presenting the subject.

The rapid advances made in dairy chemistry since the first edition was published have been covered in the text, and the sections on the composition of milk, fat and fat oxidation, lactose, casein, mineral constituents, enzymes, physical chemistry and the nutritive value of milk have been added to.

The volume is divided into five parts and subdivided into twenty-two chapters, covering the subject from the points of view of composition, constituents, physical chemistry, processing and nutritive value.

The bibliography has been considerably augmented, and the additions indicate to some extent the research which has been carried on since 1936. The author has been judicious in his selection of new matter—a serious task if a book is to avoid unwieldiness while giving due value to outstanding developments.

W. T.

Progress with Citrus By-Products

CONSIDERABLE progress with the extraction of pectin and juice from Jaffa oranges and grapefruit is reported from Palestine, where a number of such modernly equipped firms as Assis, Ltd., and Jaff-Ora, Ltd., are busy with this branch of the citrus industry. With the establishment at Tel Aviv of a special sales organisation called Palprod (Palestine Products Distribution Centre, Ltd.), substantial exports are being made to Britain, Holland, France, Switzerland, Belgium, and other countries.

One of the biggest concerns in Palestine citrus by-products is Pri Peri, Ltd., chief shareholder and initiator of which is Mr. A. Goldberg, of London and Glasgow. Mr. Goldberg has two factories in this country—Citrus Products, Ltd.—which are concerned with the canning and processing of citrus juices. Pri Peri, Ltd., alone has this year marketed 1,500 tons of juices, representing 150,000 cases of oranges and grapefruit. This factory can produce 2,500 tons of pasteurised and raw juice yearly, working on the Lemale and Scott patents.

As well as juice, pectin is also being extracted—from the peel of the orange. It is sold in pulverised and liquid forms, and has found a ready market in the Near East, where it is used as a substitute for agar-agar and other types of gelatine. Export of pectin is not yet possible on a large scale, owing to chemical difficulties, but research is continuing.

Better success is reported with the juices, which are to be processed for drinking direct and concentrated for manufacturing jam, etc.

Up till the present only Empire orange exporters could send juices to Britain duty free, but, as the regulations now allow this privilege to Palestine, a big traffic in this commodity is expected to result.

A new departure next year will be the export of Palestine canned oranges and grapefruit to this and other countries.

The Daniel Sieff Research Institute, Rehovoth, is responsible for research in connection with all these developments. This Institute has succeeded also in converting orange peel into cattle food, and production has started on a large scale in one of the local factories.

CORRESPONDENCE

Employee's Right to Wages during Illness and Workmen's Compensation Act

DEAR SIR,

In view of the reply which " Barrister-at-Law " gave to an enquiry on the above subject in your June issue, it is not my wish to prolong correspondence unduly, but I take it that in his reply your contributor has not overlooked the observations of Lord Justice Scott in the Court of Appeal when giving judgment in the recent case of Marrison *v.* Bell. He said :

> " Just as in a contract of employment it is permissible by reason of the incorporation of rules to imply a term suspending wages during the receipt of the benefit which those rules contemplate shall take the place of wages, as was done in Niblett *v.* Midland Railway Company (*supra*), so, in my view, it also results from the cases that, where under the Workmen's Compensation Act a man is receiving half his wages in the form of compensation, the Act must be interpreted as suspending the right at common law to the receipt of full wages during incapacity from accident or from a disease within that Act. That is the true ground on which to base the suspension of wages where a man is receiving by reason of incapacity compensation under the Workmen's Compensation Act." (*Vide The Times Law Reports*, p. 478, Friday, March 10, 1939.)

Would not an observation of this nature by the learned Judge of the Appeal Court be very strong authority in support of the contention that an allowance under the Workmen's Compensation Act is in lieu of wages, particularly in view of the fact that the Judge in giving judgment referred to the remarks of Lord Cozens-Hardy in Warburton *v.* Co-operative Wholesale Society Limited as quoted by " Barrister-at-Law "?

Yours faithfully,
" WORKS MANAGER."

NEWS FROM THE INDUSTRY

PLANT AND EQUIPMENT

Variable Speed Drives

The latest Variable Speed Pulley catalogue VP. 338, of Crofts (Engineers), Ltd., Thornbury, Bradford, fully describes these compact devices; the V/S Pulleys are standardised in a wide range of sizes to meet industrial requirements. It will be noted that with their existing designs no levers, pins, etc., are incorporated in the construction and that the complete V/S Pulley is of the simplest possible design.

V/S Pulleys are fixed to the motor shaft and enable infinitely variable speed to be obtained within the limits of the pulley sizes; powers are up to a maximum of 60 h.p., thus covering most requirements.

Tables listed enable easy selection to be made of complete drives for ratios up to 3 to 1; variable speed units are also listed which allow speed variation up to 4 to 1. For small power outputs the "Hirtatio" units as shown on pages 30-33 of the catalogue are standardised for ratios up to as high as 45 to 1, although for special drives ratios up to 80 to 1 are obtainable.

With reference to the J.F.S.-Jr. Vari-Speed Control this is a device for which Crofts have obtained the sole manufacturing rights and has certain special features. The control is fitted between the driving and driven machines; it is of simplest possible construction and utilises standard V-ropes. Ratios up to 7½ to 1 are obtainable and powers transmitted are up to 7½ h.p.

So far as they are aware there is no similar drive available in this country and the J.F.S.-Jr. Control should be of considerable interest to all machinery makers and users.

* * *

Refrigerating Plant

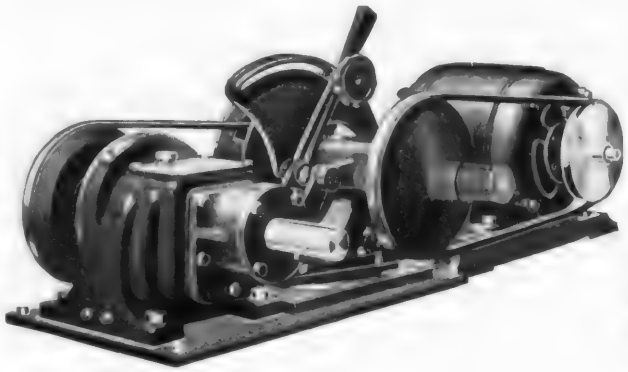
Messrs. J. and E. Hall, Ltd., of Dartford Ironworks, Kent, have been pioneers in marine refrigeration installation, and an order placed in 1929 for six Hallmark machines for the new "A" class destroyers demonstrated so successfully their usefulness and utility that since then every destroyer meat room of subsequent flotillas has been equipped with an automatic refrigerating machine and of these no fewer than 96 per cent. have been Hallmarks.

Self-contained cabinets and ready-use cupboards known as domestic automatic refrigerators have replaced the ice cooling previously used for the small refrigerators supplied for captain's and wardroom pantries, and while the British seaman may not be so fortunate as his contemporary in the United States, where ice-cream is a naval ration, a large quantity is sold in the canteens, Hallmark ice-cream making and storage plants having been supplied to nearly forty ships in the British fleet.

Hallmark refrigerating machinery is suitable for use with either methyl chloride or Freon, and it is important to note that methyl chloride used as a refrigerant, in the quantity required for the charge of the complete unit, is comparatively harmless even in the event of an escape, which is unlikely owing to the low working pressure and to the fact that the parts subjected to it are amply strong and carefully tested during manufacture. Freon may be regarded as the safest of all low-pressure refrigerants, as it is non-toxic and non-inflammable.

The call for refrigerating plant has come from all types of ships, and Hallmark installations may now be found in cross-Channel, excursion and coasting vessels, cargo and general trading vessels, cargo liners, and famous passenger liners, including the *Queen Mary* and *Queen Elizabeth*. The well-illustrated, recently published brochure No. 879 gives further details.

* * *

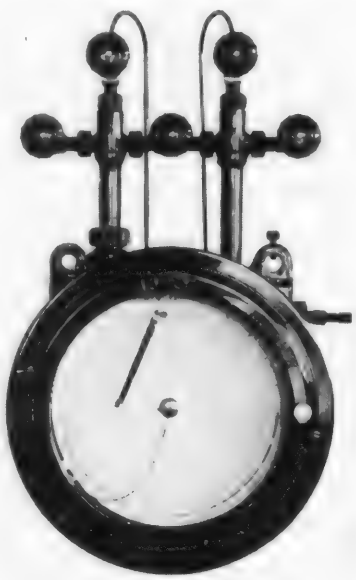


Arrangement of Croft's J.F.S.-Jr. Control and Efficiency Reduction Gear mounted on Baseplate.

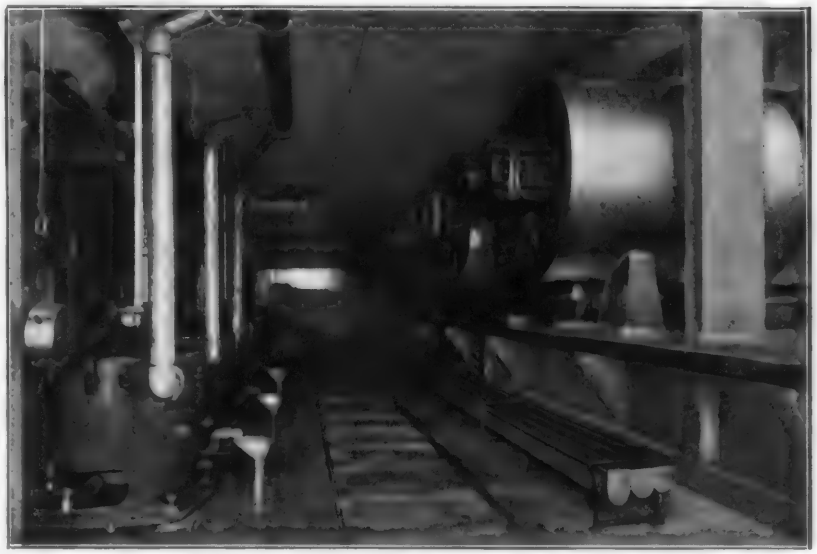
Specific Gravity Control

There are many industrial processes in which the measurement or automatic control of specific gravity of some liquids is of great importance to the maintenance of high quality as well as to economy of production. One of the more important applications is in sugar refining, where the specific gravity of the liquid must be kept at a certain figure in order to prevent crystallization and consequent troubles.

The Kent Specific Gravity Recorder Controller illustrated here is made by George Kent, Ltd., Luton, Beds., and their publication No. 885 gives full details of its construction and use.



Dry Rendering Plant



Our illustration shows an "Iwel-Laabs" Dry Rendering Plant in a New Zealand Meat Packing House. On the right of the picture is a battery of "Iwel-Laabs" Melters; in the centre is a portable Receiving and Percolating Tank, and also Fat Troughs to receive three different grades of fat. On the left a battery of "Iwel" Steam Turbine Centrifugal Fat Extractors is seen.

The materials usually arrive on the charging floor already separated and graded for treatment to produce their respective fats. Through hoppers the materials are charged into the "Iwel-Laabs" Melters. These machines are of a type incorporating a horizontal steam-jacketed cylinder with closed ends suitably constructed to withstand internal pressure, and having a shaft running through the centre which operates agitating arms.

The whole of the combined products of liquid fat and tissue matter (technically known as "cracklings"), discharges from the Melter into the Portable Receiving and Percolating Truck, so constructed that its top projects beneath the Melter discharge door.

Surplus liquid fat drains through a screen and delivers by an adjustable pipe into that particular trough serving the Fat Settling and Storage Unit handling the grade of fat then being run off.

The fat-saturated crackling remaining is shovelled from the Receiving Truck into the Steam Turbine Centrifugal Fat Extractors, where further fat extraction is achieved, the fat running by controlled pipe-line to the same Settling and Storage Unit.

The Extractor containers, which are removable, carrying the treated product, are hoisted and conveyed on an overhead track to the adjoining department housing the Grinding, Screening and Sacking Equipment.

"Iwel" Plant for Abattoirs, Bacon Factories, Cold Stores, Meat Packers, Provision Works, etc., is manufactured by Industrial Waste Eliminators, Ltd., 20, High Holborn, W.C. 1.

* * *

Electrical Thermometers

The electrical thermometers made by the Cambridge Instrument Co., Ltd., are already well known.

For efficient storage of foodstuffs the degree of refrigeration or temperature control is often required within narrow limits; also the rate at which certain products are brought to the storage temperature is of importance. Many foodstuffs do not require to be frozen. Instruments for this work, therefore, must be accurate and sensitive and be of rugged construction to withstand the conditions of use.

The multi-point indicator has been developed in co-operation with the Low Temperature Research Station at Cambridge for work requiring a high order of accuracy and for marine work where vibration often renders difficult the reading of a direct deflectional pointer. The scale engraved around the dial is over 24 inches long and each subdivision represents 0·5° F.; it is easily possible to read to 0·1° F. A selector switch enables up to 40 thermometer points to be read on one indicator. The thermometer units are hermetically sealed to eliminate moisture troubles. An important advantage is that within wide limits the accuracy does not depend on the battery voltage, and the possibility of error due to the operator omitting to check the battery condition before taking readings is thus reduced.

* * *

Modern Heavy-Duty Designs

The advantages of electric cooking, both for large requirements such as in connection with food factories, restaurants, hotels, hospitals, works canteens, and blocks of flats and for private houses, include high efficiency, easy operation and control of temperature, with automatic operation, no possibility of fires and explosions, absence of smoke, dust, and poisonous gases, and no fuel storage and ash disposal. Net operating costs are now also much lower than generally supposed. During the past few years great advances have taken place in this field, and prominent are the Simplex Electric Co., Ltd., of Oldbury (Birmingham), with their "Creda" equipment, who carry on a very large scale the complete manufacture of a wide range of electric cookers and other equipment, including enamelling and the manufacture of the hot plates.

For example, their standard heavy-duty double oven range, with maximum loading of 21·2 kW., is the largest self-contained set normally produced, which will cook for 25 people. This has two roasting ovens of different sizes, the larger being 18 in. high, 16 in. wide, and 16 in. deep (internal measurements) and the smaller 15 in., 14 in., and 15¾ in. respectively, along with a double door hot cupboard 11 in. high by 17 in. wide by 18 in. deep above the smaller oven.

In addition, there is a large hob or top plate, with generous boiling and simmering accommodation and a roomy grilling compartment over the larger oven, next to the hot plate cupboard. Other features are two switch plates, one at each side, two thermometers, balanced spring loaded doors, non-tilting oven shelves, browning plates, meat tins, and grill and pan rack. The finish also is in de luxe high grade granite-grey mottle porcelain enamel, with white enamelled door panels and

switch plates, and vitreous enamelled oven interiors.

For still larger requirements banks of ovens containing any desired number of separate independently operated units, each of 6 kW. loading, are supplied, which will cook for hundreds of people.

* * *

Colorimeter Improvements

Messrs. Adam Hilger, Ltd., inform us that the Guild Trichromatic Colorimeter and also the Hilger Colorimeter are no longer manufactured, their place being taken completely by the Donaldson Colorimeter, which, besides being simpler in construction than either of the foregoing, has also the advantage over the Hilger Colorimeter that it is sponsored by the National Physical Laboratory.

* * *

Distributive Change

It has been announced recently by Walker, Crosweller and Co., Ltd., of Whaddon Works, Cheltenham, Glos., that the Spirax Steam Traps, made by the Spirax Mfg. Co., Ltd., and since 1932 distributed by their organisation, will in future be marketed as well as made by the Spirax Mfg. Co., Ltd.

This change has been necessitated by the growing demand for the Leonard Thermostatic Valves and other items for which Walker, Crosweller and Co., Ltd., are sole licensees and manufacturers, and orders and enquiries for Leonard, Arkon and Telco specialities should be addressed as hitherto to them, while those for Spirax Steam Traps should be forwarded direct to the Spirax Mfg. Co., Ltd., also at Cheltenham, Glos.

The same representatives will, in general, continue to call upon the trade, and full co-operation between the two companies will be maintained, but it is felt that the more rigid specialisation will serve the interests of all clients in the best possible manner.

* * *

Grinding Machinery

The scope of products which may be ground successfully by the patent "Miracle" Mills, manufactured by Miracle Mills, Ltd., 90, Lots Road, S.W., is practically unlimited, and it should be noted that while the mill will ensure the maximum output at lowest cost, it is compact and simple to install.

A demonstration plant, occupying 2,000 square feet, is placed at the disposal of those wishing to send materials for testing. Enquiries by telephone or post receive prompt and courteous attention, and we would point out that the Telephone No. is "*Flaxman 1456*" and not "Flaxman 145", as stated in the advertisement which appeared in our columns last month.

Spirax Steam Traps in a Meat Products Factory.

Courtesy Fowler Bros.]

Steam Engineering Accessories

Drayton Tank Regulators and Steam Traps, manufactured by Drayton Regulator and Instrument Co., Ltd., West Drayton, Middlesex, are well known to all connected with steam engineering, and are in use in many factories concerned with food production.

The "V.T." automatic temperature regulator is self-operating, made with all sizes of valves from ¼ in. to 3 in., for controlling the temperature of hot-water supply tanks and calorifiers, process baths, and all vessels containing a liquid heated by direct steam injection, steam coils, or hot water. It is a regulator of simple but robust construction, and in common with other Drayton productions is inexpensive in relation to the saving effected. From 15 to 25 per cent. of the uncontrolled steam consumption of the vessel may be saved in the course of a week.

It should be noted that no external source of power is required for the operation of the regulator, and maintenance cost is reduced to the minimum, as only normal attention to the valve faces is required from time to time.

Drayton Armstrong inverted bucket steam traps, which at a very reasonable price are guaranteed for two years, and the "Drico" Trap for low-pressure steam heating are other items of this firm's manufacture which can be recommended as being thoroughly serviceable and practical accessories.

* * *

A New Protective Lining

Specialists in the design, manufacture and installation of all kinds of cast iron, steel and other metal tanks, Messrs. Newton, Chambers and Co., Ltd., Thorncliffe Ironworks, nr. Sheffield, have now become sole British agents for Lithcote, a process which has been perfected in America, and which is now being used extensively for the lining of tanks and equipment for the food and other industries where corrosion-resisting and acid-resisting qualities are vitally important.

Its value to those engaged in the food industry is increased by its ease of cleaning and sterilisation assured by the smooth, glass-like, non-porous surface. Lithcote linings will not impart any trace of odour or taste to sensitive products whose purity must be unquestionable, and it is entirely free from poisonous matter.

Durability is provided by correct balance between hardness and flexibility, insuring maximum service under all conditions.

COMPANY MEETING

Corned Beef

Lord Luke, presiding at the thirty-first annual general meeting of Argentine Estates of Bovril, Ltd., on May 10, said that it was impossible to run a factory for the manufacture of corned beef with the present price of cattle in the Argentine and make a profit. Making a plea for British companies overseas, he said he did not believe a British company could be expected to go on much longer in this unsatisfactory way as regards its factory in a country which he thought would like to act in a friendly way to a British company. Many agencies at home and abroad were vigorously looking after the country's export trade, but who, except the individual companies themselves, were endeavouring to assist the industries established all over the world by British capital and established often in the very countries that desired to sell primary produce to this country? It was, in fact, only a matter of the British authorities making it plain to those countries overseas that British trade must be balanced and that it was worth the while of the countries concerned to see that British companies received fair treatment and were given a reasonable chance of making an income. Continuing, Lord Luke suggested that the matter be taken in hand by a Government Department, as if left to chance, as at present, incomes from foreign investments would continue to shrink.

Government Contracts

Lord Luke reported that during the year the company had had contracts to supply from the Santa Elena factory the Army, the Navy and the Food Defence departments with corned beef, adding that the supplies had been at less than cost price and expressed some satisfaction that at any rate a portion of the company's factory loss went to the credit of Government departments. He only hoped that all the departments were buying with the same keenness and the same good fortune, as it would save any question of profiteering. Private consumers might do worse than to take advantage of the present below-cost of corned beef and store it with other products in moderate quantities.

We have from time to time commented upon the usefulness and cheapness of corned beef as a concentrated form of protein, containing quite a useful amount of fat, and its attractiveness may be enhanced by the realisation by the consumer that he is getting a good bargain.

Special Areas Industrial Development

The report of progress for the month ended April 30, 1939, shows considerable development in Durham and Tyneside, South Wales and West Cumberland.

At the end of April in Durham and Tyneside, there were ninety-five factories in production, employing 2,603 people, and on the detached sites at Pallion there were 442 people employed.

On the South Wales Trading Estate at Treforest 43 factories were occupied, giving employment to 1,518 people, and a further thirteen factories were under construction for tenants.

In West Cumberland five factories were occupied, employing 275 persons.

The total expenditure involved, excluding the capital brought into the areas by new firms being established on the trading estates and elsewhere was more than £25,000,000.

* * *

Fish Filleting Strides in U.S.

A machine for filleting fish automatically, which is expected to revolutionise present methods of marketing fish, has now after several months of controlled testing in New York been put into commercial operation in Boston by the Atlantic Coast Fisheries Co.

The new machine is claimed to be the first of its kind ever perfected for commercial use, eliminating as it does all crude and wasteful manual operations, and producing substantially greater quantities of edible flesh from the fish fillet with corresponding reduction in cost of the finished product.

The unit installed at Boston by the Atlantic Coast Fisheries Co. is to be used principally for the automatic filleting of cod and haddock, which represent the major portion of the world's production of filleted fish. The magnitude of the industry affected by the new technique is indicated by the fact that 80,000,000 lb. of filleted fish were produced in the United States in 1937 from cod, haddock and similar varieties of fish.

100 Fillets per Minute

Each unit of the new machinery has a capacity of 50 fish or 100 fillets per minute, and is claimed to be much more efficient than hand methods in removing the edible part of the fish from the bones, and it is estimated that United States production of 80,000,000 lb. of fillets in 1937 could have been increased to 94,000,000 lb. through the use of this machinery without any increase in the catch of fish.

* * *

A New Sales Effort

We have received from the sole consignees, A. C. Fincken and Co., Clifton House, Euston Road, N.W. 1, a very handsome spoon which regular users of Force will be able to obtain at a very low cost.

The specially designed Wheatear handle has called for craftsmanship of a high order, and the British firm of silversmiths, noted for the quality of their work, have given of their best.

The spoon is being offered to further the sales of Force Whole Wheat flakes, and the public are asked to send two Force packet tops and 6d. for each spoon. We are advised that the response so far has been most gratifying.

Messrs. Fincken and Co. tell us that The Design Unit, Ltd., have co-operated wholeheartedly both with themselves and the manufacturers of the spoon (Messrs. J. Bernard Stagg, of Birmingham), and there is no doubt that the result is both distinguished and pleasing.

FOOD (DEFENCE PLANS) DEPARTMENT

Cold Storage and Transport

The following appointments have been made in connection with the Food (Defence Plans) Department:

Mr. W. J. Howard has been appointed as Director of Cold Storage in connection with the Department's plans for the control of cold storage in the event of war.

Under the Department's plan for the co-ordination of food transport in the event of war, Mr. Frederick Smith (chief of the transport executive of Messrs. Lever Brothers and Unilevers) has been appointed as Director of Food Transport.

Rice Products

An Advisory Committee has been set up to assist the Food (Defence Plans) Department in drawing up plans for the supply, control, and distribution of rice and rice products in the event of war. The plans will provide, so far as possible, for the utilisation of the usual trade channels. The Committee consists of Messrs. J. K. Michie (Chairman), J. McCraken, J. McPherson, H. L. Sanderson, S. Stephenson, J. E. Sussex.

Tin and Its Uses

In the first number of a new Quarterly Review just published by the International Tin Research and Development Council appears a description of the Council's laboratories and offices at Greenford, Middlesex.

An article on the tinplate and canning industries reviews major changes in methods of production, and the application of modern plant for the cold reduction of steel and the continuous tinning of wide strip.

Of topical interest is the article on the value of canned foods for emergency stores, while suggestions are given as to the kinds of food which might be stored and their keeping qualities.

One of the principal objects of the new Review, which is intended primarily for consumers of tin and tinplate, is to summarise the results of technical researches on tin, with special reference to their application to industry.

Copies of the Quarterly Review may be had free of charge upon application to the International Tin Research and Development Council, Fraser Road, Greenford, Middlesex, England.

* * *

"Traffoblak" Lacquer

The "Traffoblak" window lacquer made by Metropolitan-Vickers Electrical Co., Ltd., is one which, when painted on windows, while allowing daylight to penetrate, will not allow the light emitted by a new type of electric discharge lamp, requiring the usual control equipment, producing a highly efficient monochromatic light, to pass out into the night. While the maximum daylight is allowed to enter, complete obscuration takes place at night. The advantage of this device during wartime is obvious.

* * *

"Staggered" Paydays

The National Amalgamated Union of Shop Assistants, Warehousemen and Clerks recently urged that paydays should be "staggered". The following is an abstract of a communication received from Mr. Graham Cunningham, Managing Director of the "Triplex" Safety Glass Co., Ltd. They argued that because, by tradition, most people are paid on a Friday, there is a shopping rush and consequent congestion on Saturday, particularly in the suburbs of London and the larger provincial towns.

The subject is obviously of importance from the point of view of the shopkeeper and shop assistant, but it is also of considerable interest to the large employer of labour.

"In the case of a large business, especially where piece-work is involved or wages paid on an hourly basis, a definite advantage might be shown by paying employees in each department or group of departments on a different day. Such an arrangement would enable the work of preparing and checking wage sheets and filling the various pay envelopes to be spread over the whole week and the normal struggle to get ready for the weekly payday avoided.

The banks would welcome 'staggered' paydays. In busy districts there is heavy pressure on bank staffs between eleven and two on Friday and to a lesser extent on Saturday morning, when the counter is besieged by the representatives of a number of different firms all endeavouring to draw money for wages, while private customers are crowded out. There is an atmosphere of strain and a liability to make mistakes; bank cashiers would, I believe, welcome any device whereby this state of affairs could be avoided.

It seems, therefore, that a scheme for 'staggered' paydays would benefit three sets of people—shopkeepers, large employers of labour, and the banks. The difficulties in the way of its application do not seem insurmountable and the advantages are so great that it would be worth while giving it a trial."

* * *

Seventy-fifth Anniversary

The Annual Outing of the Office Staff of Messrs. John Feaver, Ltd., the well-known Tin Box and Drum Manufacturers, of 120, Tower Bridge Road, S.E. 1, took place on Saturday, June 3. This was a special occasion as, in addition to it being the anniversary of the seventy-fifth year of the Company's foundation, it also marked the fiftieth year of service with the Company of the present Chairman, Mr. J. W. Feaver. To commemorate the occasion he was presented with an electric clock by the Directors, and a handsomely fitted travelling suitcase by the Office Staff.

* * *

National Mark Gloucester Cheese

A National Mark Scheme has been introduced for Gloucester cheese made from cows' milk produced in England and Wales.

The Scheme is based on the Agricultural Produce (Grading and Marking) (Gloucester Cheese) Regulations, 1939, which prescribe grade designations and grade designation marks for Gloucester cheese. Copies of these regulations may be purchased from H.M. Stationery Office, York House, Kingsway, London, W.C. 2 (S.R. and O. 1939, No. 492, price 1d. net, post free 1½d.).

A New Appointment

Mr. G. F. Adams, B.Sc., of the Research Laboratories of the General Electric Company, Wembley, has resigned to take up an apointment in September as Technical Sales Representative in the London Area for Messrs. A. Gallenkamp and Co., Ltd. He will continue to act as Hon. Secretary for the London Section of the Society of Glass Technology.

* * *

"Knock-Down" Bulk Paper Can

One of the most interesting of the many packaging innovations which were exhibited at the recent Packaging Show at the Hotel Astor, New York City, was a new Single Service Bulk Paper Can displayed by the Sealright Co., Inc., Fulton, N.Y.

The sidewall of this new type can is made collapsible so it may be shipped folded flat. Top-forming rings and can bottoms, as well as lids, are supplied in separate cartons.

An efficient assembly machine applies the top-forming ring and inserts the bottom and completely finishes the can at a high rate of speed.

The big feature of the Sealright Bulkan is that it eliminates all necessity for can storage. With the use of this machine cans may be assembled as they are filled.

* * *

British Aluminium Co., Ltd.

The British Aluminium Co., Ltd., are transferring their branch office and aluminium warehouse from 25/29, Pancras Road, N.W. 1, as from July 1, 1939, to more spacious premises at Park Avenue, North Circular Road, N.W. 10. Telephone, Willesden 4817 and 4818.

Ample stocks of the company's products—aluminium and its light alloys, in ingot and semi-manufactured forms—will be maintained at this depôt, which will be under the management of Mr. W. J. Allen.

The company also hold stocks of aluminium in most forms in warehouses at Birmingham, Leeds, Bristol, Newcastle-on-Tyne and Glasgow, and have branch offices at Manchester and Dublin.

* * *

Hot Food Conveyance

A useful set of containers for the purpose of retaining the heat of food is made by Mabbott and Co., Ltd., of Phœnix Iron Works, Manchester.

These will enable food to be transported from one place to another, and are particularly suitable for use in hospitals and institutions, and Mabbott and Co., Ltd., also manufacture wagons and carriers for the purpose of conveying the containers.

INFORMATION AND ADVICE

Making Tripe—Testing for SO_2—Manufacture of Milk Foods—Non-Alcoholic Meat and Malt Wine—Cheap Lemon Curd—Tomato Sauce and Tomato Ketchup—Peppermint Creams—Creatine and Creatinine Content of Beef Extract—Information Supplied—Information Required

Making Tripe

5,290. *Can you give me any information or references to the making of tripe as sold in the Lancashire towns? It appears to be uncooked, yet is soft and easily digested.* (Singapore.)

Briefly, the methods are as follow: The stomachs are cut open and immersed in a cleansing solution of lime and soda, which removes the dark mucous membrane from the inside. This first process is carried out in a wooden vat, and the stomachs are then put through a tripe-scraping machine, or sometimes this is done by hand. After scraping the stomachs are rinsed well and then cooked. After cooking the operation of dressing is carried out; this is merely the removal of the outside membrane of the stomach.

In Lancashire the tripe is usually sold in a cooked state, and does not call for more than re-heating.

Testing for SO_2

5,308. *Kindly supply the most practical method of testing for the amount of SO_2 in fruit juices and squashes.* (Pretoria, S.A.)

For information on practical tests for SO_2 in foodstuffs generally, we would refer you to Reports on Public Health and Medical Subjects, No. 43, *The Determination of Sulphur Dioxide in Foods*, by G. W. Monier Williams, price 1s. 3d., which we should be pleased to supply from this office.

Manufacture of Milk Foods

5,314. *I am interested in making milk foods from roller process milk powder. I am wondering what is the usual procedure after the milk powder comes off the rolls, because it seems to me that it is very important that the finished product is sterile. It also seems to me that unless I sterilise the powder after it is tinned I am going to have trouble with bacteria.*

Provided the milk powder is made from pasteurised milk, properly manufactured and stored, it should not be subject to deterioration of a bacteriological nature. The moisture content of normal milk powder is far below the requirements for microbic activity. This precludes the possibility of the development of micro-organisms usually encountered in milk. Numerous investigators report that there is no increase in bacteria after the dried milk has been sealed in the final package and that there is actually a decrease in the number of micro-organisms originally present as the storage period increases. Roller process powder usually shows a lower bacteria count than spray-dried powders and is not so liable to rancidity.

Non-Alcoholic Meat and Malt Wine

5,346. *We shall be pleased to have a recipe for the making of non-alcoholic meat and malt wine—a preparation that will keep bottled for some time without fermenting.*

To each gallon of non-alcoholic wine add 8 fl. oz. of liquid extract of malt and 4 fl. oz. of beef extract. A trace of oil of celery to the final product is an improvement.

Cheap Lemon Curd

5,348. *We are requiring a recipe for cheap lemon curd, and shall be glad to have any help you can give us in this direction.* (Northampton.)

The formula given below will serve as a basis for experimentation:

Sugar	60 lb.
Glucose	12 ,,
Margarine	4 ,,
Eggs	½ doz.
Lemon juice	1 gal.
Essence of lemon	2½ oz.
Wheat flour	6 lb.
Cornflour	6 ,,
Water	5½ gal.
Colour as desired	

Make the flour into paste with 2½ gal. of cold water and stand overnight. Add the sugar and glucose to rest of water in jar. Boil to 245° F. and cut off steam. Mix in the margarine. Add the eggs, previously whisked. Add the flour and paste and stir well. Add the lemon juice. Gently raise to 180° F. and gently simmer for 15 minutes. From this formula you will observe that there is nothing elaborate required in the way of utensils, the size of which depends upon the quantities made.

Tomato Sauce and Tomato Ketchup

5,378. *Would you be good enough to send me a good working formula for tomato sauce and tomato ketchup? Should you have some good formulæ and advice of a technical nature on condiments, would you please send me same?* (Johannesburg.)

For good formulæ and advice of a technical nature with regard to condiments, etc., we think you could not do better than obtain a copy of Campbell's Book, price 42s., postage extra, which we should be pleased to forward from this office on receipt of order. We give below

formulæ for tomato ketchup and tomato sauce, which we think would answer your purpose very well:

(1) *Tomato Ketchup.*

Tomato pulp, specific gravity 1·020	800 gal.
Sugar	480 lb.
Vinegar, 100-grain white distilled	36 gal.
Onions, ground	136 lb.
Cloves, headless	2 lb. 9 oz.
Allspice	3¼ lb.
Cinnamon, broken and sifted	3¼ ,,
Mace	3¼ ,,
Cayenne pepper	1 ,,
Cooked to a finish of	350 gal.

This recipe makes a very good average ketchup.

(2) *Tomato Sauce.*

Peeled tomatoes	4,320 lb.
Sugar	275 ,,
Salt	60 ,,
Onions, peeled and chopped fine	8 oz.
Cayenne pepper	20 ,,
Cinnamon	40 ,,
Essential oils	6½ ,,

Oil of pimento, 1 lb; oil of clove, 2 lb.; finish, 280-290 gal.; yield, 310 gal.

Peppermint Creams

5,410. *Will you please send us a formula and method for making peppermint creams which will not crystallise and yet keep their softness?* (Kidderminster.)

The secret, if one can call it so, of making good mint creams, lies in preparing a satisfactory glazing solution. Such a solution may be prepared, for example, by dissolving equal parts of gum arabic and egg albumen in water.

A syrup is prepared by adding 3½ oz. of water to 1 lb. of a good invert sugar. Heat the latter just enough to clear and then add the water.

A fondant is made by cooking together 80 lb. of very white sugar, 10 lb. of glucose, and 10 lb. of invert sugar. This syrup is prepared with 41 lb. of water and is cooked to 244° F. When thoroughly cooled it is beaten to fondant in any way chosen.

Within an hour of the time of making, the fondant is melted down in a water-jacketed pan and the body reduced to casting consistency by addition of the first syrup mentioned. The creams are cast as cool as possible in rubber mats..

Creatine and Creatinine Content of Beef Extract

5,405. *Is the creatine and creatinine content of beef extract a reliable index of its quality?* (Bristol.)

In ordinary circumstances this is so. During the extraction of beef the creatine is recovered almost quantitatively from the lean part. Sinews, bones, organs, etc., are practically free from these bases.

It is true that it is possible that creatine and creatinine in soups made from pure lean meat may be destroyed during manufacture, but it is very rare and generally due to some slight bacteriological action, due to the inadvertent cooling of liquors, and may be looked upon as an accident. Apart from the destruction of creatine and creatinine, there is a loss of pungency which militates against the quality of the extract so that the creatine and creatinine standard still applies.

Apart from the creatine and creatinine content, extracts are judged by the taste, which is greatly affected by the degree of degradation of the gelatine and albumoses.

An interesting insight into the mode of manufacture of beef extract may be found in the ratio of creatine and creatinine.

Information Supplied

5,331. *Please will you inform us where a copy of Mr. V. L. S. Charley's address on Pure Fruit Juices and Syrups can be obtained, also the names and addresses of firms supplying commercial enzymes used to sterilise pectic compounds?* (Portslade.)

This information has been given.

5,336. *A customer has asked us if we could put him in touch with a firm making small tomato pulpers worked by hand-power, suitable for experimental and demonstration purposes.* (Birmingham.)

Names of manufacturing firms were given.

5,343. (1) *Kindly give address of the firm supplying machinery for the manufacture of casks from paper;* (2) *address of firm which can supply the necessary plant for making beet sugar.* (New Zealand.)

These names and addresses were given.

5,350. *Kindly tell us the name of suppliers and their addresses for glue for labelling and adhering biscuit packing, also glue for adhering Cellophane; the glue must be quick drying.* (Singapore.)

Names of suppliers were given.

5,352. *Can you tell me the names of manufacturers or suppliers of machine for sorting peas by the brine flotation process to eliminate low-grade or yellow peas, cutting machine for French beans; peach grader and cutter, also stoning machine?* (Italy.)

Manufacturers of plant for handling, preparing and grading all types of fruit and vegetables were given.

5,368. *Can you put us in touch with manufacturers or sellers of "Aplona"?* (Sinagoga.)

This information was given.

5,370. *Can you let us know where angelica for candying may be obtained?* (London.)

Names of suppliers were given.

Information Required

5,326. *We should be glad if you could let us know the name and address of the manufacturers of the "Avroma" Cream Emulsifier and Cooler.* (Sussex.)

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RECENT PATENTS

These particulars of new patents of interest to readers have been selected from the "Official Journal of Patents", and are published by permission of the Controller of H.M. Stationery Office. The journal can be obtained from the Patent Office, 25, Southampton Buildings, London, W.C. 2, price 1s. weekly (annual subscription £2 10s.).

Abstracts of Recent Specifications

Group Abridgments can be obtained from the Patent Office, 25, Southampton Buildings, London, W.C. 2, either sheet by sheet as issued on payment of a subscription of 5s. per Group Volume, or in bound volumes price 2s. each.

Preserving Ground Coffee, Oatmeal, and Other Powdery Foods

Ground coffee, oatmeal or other food of a powdery nature is compressed at least to one-half of its normal volume and is inserted in a tubular container 20 of cellulose material to form a hard, solid package closed by a metal cap 24. In use, the consumer cuts off a length and replaces the cap on the shortened package. The coffee is compressed by rams in a mould box exhausted of air and is expelled from the mould by a further set of rams into the containers.

FIG. 3.

500,083. Bell, J. W.

Radio-Activated Therapeutic Devices

A device stated to have therapeutic and stimulative properties comprises a potato or other tuber into which is inserted a thread of radiumised textile material, part of the thread preferably being bound round the exterior of the tuber.

500,980. Shepherd, T. L.

Beer; Food for Animals

Whey is mashed with malt, which is then fermented to produce beer. Preferably the whey is de-albumenised by heat and adjusted to a definite acidity—*e.g.*, *p*H 6·5 to 7—before mashing. The separated albumen may be used as animal fodder.

500,912. Roeder, G.

Treating Egg Whites to Improve Their Keeping and Whipping Qualities

Egg whites are treated to improve their keeping and whipping qualities by adding to the liquid egg whites sufficient acid to bring the *p*H value to about 5·8, *e.g.* 0·15 per cent. by weight of hydrochloric acid, agitating in vacuum, *e.g.* of 28 inches, at a temperature, *e.g.* about 50° C., which is slightly below the coagulating point of the liquid egg whites, until the hydrogen ion concentration decreases to a *p*H value of 7 or below, and finally drying, freezing or condensing. Sulphuric or tartaric acid may alternatively be used. Where the amount of acid used is increased—*e.g.*, where 0·22 per cent. of hydrochloric acid is employed—the acid is added in several portions with heat and vacuum treatment between, to enable the change in *p*H value to be obtained. When spray drying is employed, the acid is added in two or more stages, the material being each time brought to a *p*H value of about 5·8 and subjected to the heat and vacuum treatment, the agitation being omitted.

500,800. McCharles, C. H., and Mulvany, H. A.

Yeast

Yeast or similar micro-organisms with high ergosterol content, grown according to the parent specification, are subjected, while still suspended in the original liquor of the main treatment or after removal therefrom and redilution with water, to supplementary aeration in the presence of an oxygen carrier such as methylene blue or indigo carmine. Preferably an organic nutrient devoid of nitrogen and phosphorus, such as ethyl alcohol or lactic acid, is added—*e.g.*, in proportions of 40 to 60 per cent. of the weight of the yeast.

500,663. International Yeast Co., Ltd., and Bennett, W. G.

Glucose

Starch is converted by means of acid in the presence of a molybdenum catalyst. The catalyst may be used in the form of salts, molybydic acid, oxides or halogen compounds and be of the order of 0·013 per cent. of the starch converted. The resultant product has less tendency to crystallise and has a specific rotation lower than that of starch converted by means of acid alone to the same dextrose equivalent. The dextrose equivalent may range from 66 to 90 per cent., according as to whether a syrup or semi-solid mass is desired.

501,142. Stevens, A. H. (Staley Manufacturing Co., A. E.).

Food Preparations; Glucose and Like Sugars

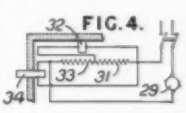
In the treatment of cereals or starch of high protein content to convert the starch to dextrins, gums or sugars by means of a converting agent—*e.g.*, hydrochloric, hydrobromic or nitric acid—the tendency of the non-starch components of the material to take up the converting agent is overcome by the addition of "satisfying agents," such as acids—*e.g.*, boric, formic, acetic, propionic, lactic or oxalic acid—aldehydes, formaldehyde, acetaldehyde, or furfurol, or salts—*e.g.*, copper, nickel or cobalt chloride. The material used may be completely dry, or moist. If it is moist, a gel-inhibiting agent may be added, as described in Specification 429,833 (Group V). The converting agent may be added in successive small quantities, or as a gas, in which case no satisfying agent need be used. The product may be used in making bread, cakes and the like, the satisfying agent in such a case being of a non-harmful nature.

500,640. Stein-Hall Manufacturing Co.

Automatic Control Systems

Temperature; Humidity.—To preserve products of the soil such as fruit and vegetables, a slow uniform flow of air is passed therethrough by means of a fan or blower driven by a motor 29 in series with a resistance 31, which is short-circuited by a thermostat 33 when the temperature in the storage compartment is above a certain value. A second resistance 33 may also be placed in series with the motor and a differential thermostat 34 provided, which short-circuits both resistances when the dew point of the outer atmosphere approaches the temperature in the compartment. The thermostat 34 may be replaced by a humidistat, which short-circuits the resistances when the humidity in the compartment approaches saturation. The thermostat 32 may be omitted when the system is used in a region where the temperature never approaches freezing. Specification 240,507 (Class 137) is referred to.

FIG. 4.



498,912. Toledo Scale Manufacturing Co.

Latest Patent Applications

13371. Huntley and Palmers, Ltd., and Rabone, H. M.: Apparatus for cleaning, etc., tins, etc. May 4.

13140. Plews Processes, Inc.: Method of treating cacao beans. May 2.

12956. Nietiedt, A.: Method for pickling meat. May 1.

12875. Cullis, L. T. W.: Storage of foodstuffs. April 29.

12801. Associated Appliances, Ltd., and Cohen, A. J. U.: Foodstuff. April 28.

13934. Frey, W. J. A.: Reconstitution of milk and cream. May 10.

Complete Specifications Accepted

Printed copies of the full Published Specifications may be obtained from the Patent Office, 25, Southampton Buildings, London, W.C. 2, at the uniform price of 1s. each.

505,131. H. A. G. Coffee Co., Ltd.: Rendering non-poisonous drugs and foods or other aqueous extracts of such substances that contain caffeine.

504,801. Standard Brands, Inc.: Filtration of liquid egg material. (Addition to 438,233.)

504,775. Costa, M.: Production of dulcified and ripened cream cheeses.

TRADE MARKS

AMSEN.—605,811. **Flour; bread, biscuits (other than biscuits for animals), cakes, pastry and confectionery.** JAMES FAIRCLOUGH AND SONS, LTD., Mersey Mills, Warrington, Lancashire. May 17.

ANONA.—604,951. **Biscuits, but not including biscuits for animals or worm biscuits.** GEORGE KEMP, LTD., North Circular Road, Cricklewood, London, N.W. 2. May 17.

ATOZ.—605,192. **Cereal preparations (for food), bread, cakes, pastry, confectionery and biscuits (but not including biscuits for animals).** CYRIL JOHN SIDNEY WRIGHT, 98 to 102, Bermondsey Wall, London, S.E. 16. May 10.

BEETIS.—606,083. **Sausages and minced meat.** F. WATKINS PROPRIETARY, LTD., 184, Bourke Street, Melbourne, State of Victoria, Australia. May 17.

BLACK MAGIC.—603,572. **Non-alcoholic beverages and preparations for making beverages.** ROWNTREE AND CO., LTD., The Cocoa Works, Wigginton Road, York. (By Consent.) (Associated.) May 10.

COUNTRY COUSIN. — 605,679. **Dairy products (for food).** HIGH-BRIDGE BACON CO., LTD., New Road, Calne, Wiltshire. May 10.

FERROLAC.—B 604,741. **Infants' foods containing milk and iron.** GLAXO LABORATORIES, LTD., Greenford Road, Greenford, Middlesex. May 3.

FISS-COFF.—604,608. **Syrups, composed of coffee and sugar for making beverages and aerated beverages made from such syrups.** AMAZONS, LTD., Middle Lane, Teddington, Middlesex. April 19.

FLAYDUST.—604,515. **Flour.** STANLEY GORDON LEWER, trading as S. G. Lewer and Co., 36 and 39, Mincing Lane, London, E.C. 3. April 26.

FONDCRIM.—605,174. **Sugar paste for making sweetmeats and for icing and filling cakes and pastries.** THE CRIMONY CO., LTD., 183, Heath Road, Twickenham, Middlesex. May 17.

FRIGOSLAB. — 603,944. **Refrigerating slabs.** FRIGIDAIRE, LTD., Edgware Road, The Hyde, Hendon, London, N.W. 9. April 26.

GOOD NEWS.—604,824. **Chocolate and chocolate confectionery.** A. J. CALEY AND SON, LTD., Chapel Field Works, Norwich. April 26.

The above-mentioned goods and goods of the same description will be struck out from the goods of Registration No. 544,371 (2897) xlii if and before the applicants' mark is registered. April 26.

KIT.—605,644. **Edible oils and edible fats.** J. BIBBY AND SONS, LTD., Bibby's Buildings, 21, King Edward Street, Liverpool. May 17.

LAVINIA.—605,861. **Tea.** JOHN MARK AND CO., LTD., 17 and 19, St. Ann's Square, Manchester, 2. May 10.

MELONGE.—604,392. **Food preparations consisting principally of blancmange powder.** PEARCE DUFF AND CO., LTD., 126, Spa Road, Bermondsey, London, S.E. 16. April 26.

MI-MA-MADE. — 605,560. **Sausages.** FRED BROWN and ALFRED GEORGE BROWN, trading in co-partnership, 25, Barrack Road, Northampton. May 10.

OITISAIN. — 605,999. **Industrial oils (other than edible oils and fats and essential oils).** WILSON, SONS AND CO., LTD., Salisbury House, London Wall, London, E.C. 2. May 10.

PACIFIC.—603,471. **Butter; and dried, condensed and evaporated milk (for food).** THE NEW ZEALAND CO-OPERATIVE DAIRY CO., LTD., Dairy Building, Corner of London Street and Victoria Street, Hamilton, Auckland, New Zealand. (Associated.) May 17.

Advertised before acceptance. Section 18 (1) (proviso).

PROLACTO.—604,001. **Bread, biscuits and flour, all being specially prepared foods for invalids.** CALLARD, STEWART AND WATT, LTD., 74a, Regent Street, London, W. 1. April 26.

SAVEL. — 605,375. **Egg substitute powder.** A. GOLDREI AND CO., LTD., Tabard House, 116, Southwark Street, London, S.E. 1. April 19.

SNOW BEAR.—605,660. **Frozen eggs, frozen egg yolk and frozen egg whites.** MITSUI BUSSAN KABUSHIKI KAISHA, trading also as Mitsui and Co., Ltd., 1-2, Chome, Munromachi, Nihonbashi-Ku, Tokio, Japan, and Royal Mail House, Leadenhall Street, London, E.C. 5. May 3.

THISTLE.—605,159. **Sardines in oil.** JOHN R. HISTED, LTD., 43, Eastcheap, London, E.C. 3. (By Consent.) May 17.

VOSTYLA.—605,113. **Fish, fruit, meat, poultry and vegetables, all being bottled, canned or preserved, and dried fruits and evaporated fruit.** WILLIAM BROWN AND CO. OF LIVERPOOL, LTD., 11 and 13, Victoria Street, Liverpool. (Associated.) May 17.

This list of trade marks of interest to readers has been selected from the "Official Trade Marks Journal", and is published by permission of the Controller of H.M. Stationery Office. The journal can be obtained from the Patent Office, 25, Southampton Buildings, London, W.C. 2, price 1s. weekly (annual subscription £2 10s.).

NEW COMPANIES

Thomas Bakers, Ltd. (351886.) April 14. 193, High Street, Acton, London, W. 3. Grocers, provision mchts., etc. £5,000. Dirs.: Miss E. Baker and Miss C. M. Baker.

George Briscoe, Ltd. (352239.) April 24. 87, Old Meeting Street, West Bromwich, Staffs. Wholesale and retail grocers and provision mchts., etc. £3,000. Dirs.: G. T. Briscoe, R. H. Briscoe.

Carton Industries, Ltd. (352356.) April 26. Carton and container manufacturers, packing case and box makers, etc. £4,200. Permt. dirs.: L. Ascher, 276, Elgin Avenue, London, W. 9; C. B. Yearsley, 11, Carven Hill, London, W. 2.

Samuel Fogg and Co., Ltd. (353184.) May 19. Church Street Works, Little Lever, near Bolton. Manufacturers of and dealers in mineral and aerated waters. £2,500. Directors: R. Wright, 52, Lidgett Lane, Leeds 8; Mrs. J. Brown, 46, Pealter Lane, Sheffield; J. Tyldesley, jun., 226, Church Street, Little Lever, near Bolton.

R. G. Grass, Ltd. (353499.) May 31. To acquire patents relating to the preservation of agricultural and horticultural crops of all kinds and foodstuffs, and to enter into an agreement with R. G. Foods Parent Co., Ltd., and Chas. Goodall, and to carry on the business of preservers of agricultural and horticultural crops and foodstuffs, etc. £2,000. Directors to be appointed by the subscribers.

Heather Confectioners Co., Ltd. (353293.) May 24. To acquire the business and undertaking, together with all the assets and liabilities of the Heather Confectionery Co., Ltd. £5,000. Directors to be appointed by the subscribers.

Processed Nut Co., Ltd. (353156.) May 19. 93-97, Regent Street, London, W. 1. Importers, manufacturers and blenders of "Ultra" roasted nuts, and patentees of and manufacturers of automatic nut-vending machines. £1,000. Directors: H. Bowen, 3, Fairfax Road, London, N.W.; J. C. McLaughlin, 501, Howard House, Dolphin Square, S.W.

T. Ridgway Cooper and Co., Ltd. (351730.) April 11. 24, Seel Street, Liverpool, 1. Mchts., importers and exporters of and wholesale and retail dlrs. in tea, coffee and cocoa; grocers, etc. £3,500. Dirs.: T. Ridgway Cooper, J. E. Ferguson.

R. C. Stallman, Ltd. (352284.) April 25. Mnfrs., exporters and importers and dlrs. in connection with foreign and colonial produce, spices, etc. £2,000. Dirs.: R. C. Stallman, 58, Thurlow Park Road, London, S.E. 21; E. H. Mayer, 40, Ivor Court, London, N.W. 1.

James Waterworth and Sons, Ltd. (352241.) April 24. 5 and 5a, Great Homer Street, Liverpool. Wholesale and retail fruit, potato and vegetable dlrs., etc. £40,000. Dirs.: J. Waterworth, H. Waterworth, F. Waterworth.

The above-mentioned particulars of new companies recently registered have been extracted from the daily register of Messrs. Jordan and Sons, Ltd., company registration agents, Chancery Lane, W.C. 2.